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# *The* JOURNAL *of*
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# A Study of the Filter Paper Microscopic (FPM) Test for Syphilis

## Preliminary Report [1]

Ad Harris [2] and Sidney Olansky, M. D.[3]

At the direction of the Office of the Chief of the Division of Venereal Disease, United States Public Health Service, a study to evaluate the relative efficiency of the FPM (*1*) test for syphilis was organized. The laboratories of Dr. Kahn, Dr. Kline, Mr. Mazzini, Eastern Medical Center (Durham, N. C.), and the Venereal Disease Research Laboratory (Atlanta, Ga.) were selected for this purpose.

The selected outline for the study included:

1. Collection of five filter paper strips and tubes of blood (vacutainers) from each donor. Collection and distribution of specimens were to be accomplished at Eastern Medical Center and at Alto Medical Center, Alto, Ga. (by the staff of the Venereal Disease Research Laboratory).
2. Blood specimens from 10 to 30 donors were to be collected and mailed on Tuesday of each week, and tests were to be performed on Friday of each week in all laboratories.
3. Each of the five testing laboratories would perform the FPM test, as published, plus any modification of this procedure that might be selected, on the filter paper specimens. The accompanying tube of whole blood would be used for the performance of any of the testing methods then in use in the respective laboratories.
4. Antigen for the FPM test and the VDRL test, if performed, was to be obtained from a common lot. This antigen was distributed by the Venereal Disease Research Laboratory. Other antigens used were not necessarily from the same lot or source.
5. At least one technical worker from each of the testing laboratories (two from the Venereal Disease Research Laboratory) would be sent to the Eastern Medical Center for training in the technic of the FPM test by Miss Shirley Busch.
6. Results of all tests were to be recorded on report forms furnished for this purpose and returned to the Venereal Disease Research Laboratory for review. Final tabulation and statistical analyses of findings were to be made by the Office of the Chief, Division of Venereal Disease, United States Public Health Service.

At the date this preliminary report is being written, blood specimens from 266 donors have been distributed. The purpose of this report is to record a summary of the results so far received from this study and to discuss briefly these findings. This is a preliminary report only since results from this study, when completed, will be submitted to a more thorough and critical analysis.

Results obtained from each of the five testing laboratories are recorded in the following tables. Under the FPM test heading, all reported findings of "positive," either with one or four squares of paper or with both, are included under the "positive" column. All "weakly positive" reports, on either one or four pieces of paper, are included under the "weakly positive or doubtful" headings.

### Discussion

The relative value of a weakly positive as opposed to a positive report will not be discussed since this study was not designed for the purpose of determining the relative value of the FPM test as a quantitative procedure, but rather to ascertain its relative efficiency as a "detector" test for syphilis infection.

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[1] From the Venereal Disease Research Laboratory, U. S. Public Health Service, Atlanta, Ga. Read at the Venereal Disease Seminar, Hot Springs, Ark., Sept. 27–28, 1950.

[2] Assistant Director; Serologist, U. S. Public Health Service.

[3] Director; Senior Surgeon, U. S. Public Health Service.

Although all tests were not performed on all specimens from every donor (table 1), it will be noted that a larger number of negative reactions were obtained by the FPM method than by any other procedure. If all recordings under the "not tested" column in this table were considered to be negatives, the total of negative reactors by the FPM procedure would still total approximately twice that of other tests listed.

The larger number of "negative" reactions obtained in the Eastern Medical Center Laboratory with the FPM method is also evident (table 2). With the exception of a short recent period, the FPM tests in this laboratory were performed by Miss Busch, coauthor of the test.

Results reported by Dr. Kahn's laboratory are recorded in table 3. Here again a greater number of negative reactions was obtained with the FPM test than with either of the Kahn procedures. However, the relative differences between these figures is not so great as was shown by the two previously discussed tables.

In table 4, the test referred to under the heading "FPM-Mazzini-cardio" is an FPM test using the Mazzini, rather than the VDRL slide test antigen. It may be noted from this table that: (1) The relative differences between the number of negative results obtained by the four listed procedures are in slightly closer agreement than was shown on the preceding tables; and (2) the total numbers of negative reactions under the FPM test headings are much lower, i. e., 37 and 30, as compared with 66 from Dr. Kahn's laboratory, 90 from the Eastern Medical Center laboratory, and 86 from the Venereal Disease Research Laboratory. In answer to an inquiry, Mr. Mazzini has stated that the FPM test in his laboratory is, according to his instructions, being performed in exact accordance with the testing outline. However, even in the series of reports from Mr. Mazzini's laboratory, the FPM procedures have produced a greater number of negative reactions than were found with the other methods.

**Table 1.—*Results obtained on filter paper strips and blood specimens [1] tested in Venereal Disease Research Laboratory***

| Reaction | FPM test | Kahn standard test | Kolmer test | Kline standard test | VDRL slide test | Mazzini test | Rein-Bossak test |
|---|---|---|---|---|---|---|---|
| Positive | 151 | 210 | 203 | 231 | 226 | 219 | 227 |
| Weakly positive or doubtful | 27 | 14 | 6 | 7 | 13 | 12 | 4 |
| Negative | 86 | 32 | 34 | 12 | 24 | 19 | 17 |
| Not tested | 2 | 10 | 23 | 16 | 3 | 16 | 18 |
| Total | 266 | 266 | 266 | 266 | 266 | 266 | 266 |

[1] Distributed from Eastern Medical Center, Durham, N. C., and Alto Medical Center, Alto, Ga.

**Table 2.—*Results obtained on filter paper strips and blood specimens [1] tested in Eastern Medical Center laboratory, Durham, N. C.***

| Reaction | FPM test | Kahn standard test | Kolmer test | VDRL slide test |
|---|---|---|---|---|
| Positive | 158 | 215 | 192 | 212 |
| Weakly positive or doubtful | 15 | 11 | 9 | 13 |
| Negative | 90 | 37 | 40 | 37 |
| Not tested | 3 | 3 | 25 | 4 |
| Total | 266 | 266 | 266 | 266 |

[1] Distributed from Eastern Medical Center, Durham, N. C., and Alto Medical Center, Alto, Ga.

**Table 3.—*Results obtained on filter paper strips and blood specimens [1] tested in Dr. Kahn's laboratory***

| Reaction | FPM test | Kahn standard test | Kahn presumptive test |
|---|---|---|---|
| Positive | 188 | 218 | 227 |
| Weakly positive or doubtful | 11 | 3 | -------- |
| Negative | 66 | 44 | 35 |
| Not tested | 1 | 1 | 4 |
| Total | 266 | 266 | 266 |

[1] Distributed from Eastern Medical Center, Durham, N. C., and Alto Medical Center, Alto, Ga.

**Table 4.—*Results obtained on filter paper strips and blood specimens* [1] *tested in Mr. Mazzini's laboratory***

| Reaction | FPM test | FPM-Mazzini-cardio test | VDRL slide test | Mazzini-cardio test |
|---|---|---|---|---|
| Positive | 199 | 204 | 231 | 233 |
| Weakly positive or doubtful | 28 | 30 | 13 | 14 |
| Negative | 37 | 30 | 20 | 17 |
| Not tested | 2 | 2 | 2 | 2 |
| Total | 266 | 266 | 266 | 266 |

[1] Distributed from Eastern Medical Center, Durham, N. C., and Alto Medical Center, Alto, Ga.

Results reported from Dr. Kline's laboratory, as presented in table 5, are somewhat similar to those obtained from Mr. Mazzini. The "modified" FPM test performed in this laboratory utilized the "Kline-cardio" antigen rather than the VDRL test antigen. Here also, a larger number of negative reactions were obtained with the FPM methods than with other reported procedures.

During the multiphase survey in Atlanta, Ga., approximately 1,000 FPM filter paper strips were collected from donors coming into three stations, by dipping the paper into the tube of blood obtained by venipuncture. The tubed blood sample was tested by the VDRL slide test procedure, both qualitative and quantitative. FPM tests were performed on the filter paper strips using the same antigen that was used for the VDRL slide test. A record of the results obtained is presented in tables 6 and 7.

**Table 5.—*Results obtained on filter paper strips and blood specimens* [1] *tested in Dr. Kline's laboratory***

| Reaction | FPM test | FPM modified test | VDRL slide test | Kline standard test | Kline diagnostic test | Kline exclusion test |
|---|---|---|---|---|---|---|
| Positive | 130 | 145 | 182 | 194 | 172 | 191 |
| Weakly positive or doubtful | 1 |  | 9 | 7 | 10 | 8 |
| Negative | 88 | 74 | 28 | 18 | 37 | 20 |
| Not tested | 1 | 1 | 1 | 1 | 1 | 1 |
| Total | 220 | 220 | 220 | 220 | 220 | 220 |

[1] Distributed from Eastern Medical Center, Durham, N. C., and Alto Medical Center, Alto, Ga.

It was noted that a large percentage of the weaker-reacting bloods in this series failed to yield positive or weakly positive reactions in the FPM method, and that a small proportion of relatively high-titered bloods also failed to react in the FPM test.

**Table 6.—*Comparison of results of VDRL slide tests and FPM tests on specimens collected from 1,011 donors during the Atlanta, Ga., multiphase survey (June 7, 8, 9, 1950)***

| FPM test | VDRL slide test |  |  |  |  |
|---|---|---|---|---|---|
|  | Positive | Weakly positive | Negative | Not tested | Total |
| Positive | 21 |  |  |  | 21 |
| Weakly positive | 19 |  | 1 |  | 20 |
| Negative | 78 | 86 | 801 | 5 | 970 |
| Total | 118 | 86 | 802 | 5 | 1,011 |

**Table 7.—*Tabulation of comparative results obtained on 118 specimens giving positive reactions in the VDRL slide test (from table 6)***

| FPM test | VDRL slide test |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|---|---|
|  | Positive 100 dils | Positive 50 dils | Positive 25 dils | Positive 10 dils | Positive 5 dils | Positive 2½ dils | Positive 1 dil | Total |
| Positive | 2 | 3 | 2 | 12 | 1 | 1 |  | 21 |
| Weakly positive | 1 | 1 | 1 | 9 | 4 | 2 | 1 | 19 |
| Negative | 1 |  |  | 8 | 12 | 13 | 44 |  |
| Total | 4 | 4 | 3 | 29 | 17 | 16 | 45 | 118 |

Attempts to make the FPM test appreciably more reactive by the use of hypertonic salt solutions, varied means of extracting the paper squares, and the use of acids or buffer solutions were not successful in the Venereal Disease Research Laboratory. Since Miss Busch had stated that drying of the filter paper strips over calcium salt might increase the end result of the FPM test, the residuals of 57 filter paper strips that had previously been tested were placed over calcium salt in a desiccator for 18 hours and retested in the Venereal Disease Research Laboratory. The paper strips selected were from negative or weakly positive FPM groups that were accompanied by stronger reactions in other testing procedures. In this series, the second testing produced five weakly positive on previously reported negative FPM reactors, plus one positive reaction on a weakly positive reactor, and seven negative reactions on previously reported weakly positive reactors in the FPM test.

Not all the donors used in the study involving the five testing laboratories have been diagnosed as syphilitic but the great majority (more than 95 percent) fall into this category. Clinical abstracts are being obtained from all these donors for final evaluation.

Filter paper strips for the FPM test, distributed in these studies, were prepared by dipping them into a tube of blood, immediately after venipuncture, and then placing them on paper toweling. Gross observation indicates that at least as much blood, and probably more, is attached to filter paper strips collected in this manner than would have been had they been collected from finger punctures.

It was also noted that some paper strips obtained both by finger puncture and by dipping had areas of greater blood density so that sections from a single strip were not always equal as to blood content. This factor alone could produce variation in results obtained from testing two sections of a single filter paper strip. It is also possible that the capillary action of the paper toweling, on which the filter paper strips are placed for drying, may remove more serum from the paper strip than would be evidenced by the color transfer, thereby proportionally decreasing the reactive component (globulin) of the blood dried on the strip used for the FPM test.

## Summary

1. Results obtained in a study including five testing laboratories and a series of 1,011 blood specimens separately tested in the Venereal Disease Research Laboratory indicate that the FPM test is less reactive than the other testing methods used.

2. Attempts to increase the reactivity level of the FPM test to that of the other procedures listed, by modifications including the substitution of more reactive antigen emulsions, were unsuccessful.

## Conclusion

Results herein reported indicate that the FPM test, as published, is less reactive than several other widely used testing procedures and therefore would be less efficient as a "detector" test for field survey use. This fact should not militate against the use of the FPM test in the field under conditions in which another type of blood collection cannot be used.

The figures in this paper do not necessarily reflect the relative efficiency of the several listed methods in the detection of congenital or other phases of syphilis, of any specific age group, since the proportionate numbers of weakly or strongly positive serologic reactors in these groups have not been studied by the authors.

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1. HOGAN, RALPH B.; BUSCH, SHIRLEY: Filter paper microscopic test for syphilis, or the FPM test. A preliminary report. J. Ven. Dis. Inform., 31: 37–45. February 1950.

# High Potency of a Penicillin G in Experimental Syphilis[1]

**R. C. Arnold, M. D.,[2] and James D. Thayer, Ph. D.[3]**

The spirocheticidal effect of crystalline penicillin G may not be reflected by the generally used bacterial-assay methods that determine the Oxford units. The efficacy of various species of crystalline penicillins in the treatment of experimental syphilis was reported in an earlier study (*1*). The $CD_{50}$ range for crystalline penicillin G varied from 1,000 to 2,000 units and, according to the Reed-Muench formula, the calculated dosage ranged from 1,450 to 1,600 units. The present study deals with a crystalline penicillin G that appears to have high antispirochetal values. If different penicillin compounds of the same type exhibit variations in spirocheticidal potency, divergent results in clinical syphilis studies may be expected.

A penicillin dosage that was expected to cure at least 50 percent of the syphilitic animals was used. In experiment A the dosage of crystalline penicillin G was 2,000 Oxford units per kilogram of body weight, divided into 24 equal doses injected intramuscularly every 4 hours. The resulting cure rate indicated that the penicillin used (Commercial Solvents Corp., lot No. 47010205) was unusually potent. Other experiments were made with varying dosages of penicillin from ampules in the same lot in order to determine the therapeutic response to minimal dosages.

## Method

The procedures used for infecting, diagnosing, and treating the animal with experimental syphilis and for determining the curative effect were those recommended by the Subcommittee on Experimental Syphilis, Syphilis Study Section, National Institutes of Health (*1*).

The penicillin solutions used in each experiment were made by diluting all the penicillin in a given ampule with sterile distilled water. Immediately after preparation at least 24 bottles of the diluted penicillin solution were quick-frozen in rubber-stoppered Pyrex vaccine-type bottles and not thawed until needed for therapy. A new ampule of penicillin was opened and a new solution freshly prepared for each study. The final dilution was made so that 1 cc. contained the necessary units per injection for the largest animal. Smaller animals received proportionately smaller volumes measured and administered with tuberculin syringes.

The total units in each ampule of penicillin were assayed (*2, 3*), as well as the units per cubic centimeter in the final dilutions. The dilute preparation after therapy was completed was also assayed.

## Results

The results of the series of experiments using different dosages are summarized in table 1.

**Table 1.**—***Results obtained from using different dosages per kilogram of body weight of a crystalline penicillin G***

| Experiment | Number of animals | Total units of penicillin | Number of doses | Hours between doses | Number of days treated | Number of cures | Number of failures |
|---|---|---|---|---|---|---|---|
| A | 31 | 2,000 | 24 | 4 | 4 | 31 | 0 |
| B | 19 | 800 | 24 | 4 | 4 | 19 | 0 |
| C | 15 | 800 | 84 | 4 | 14 | 15 | 0 |
| D | 28 | 230 | 24 | 4 | 4 | 22 | 6 |
| E | 32 | 115 | 24 | 4 | 4 | 28 | 4 |

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[1] From the Venereal Disease Research Laboratory, U. S. Public Health Service, Atlanta, Ga., and the U. S. Marine Hospital, Staten Island, N. Y.

[2] Medical Director, Chief, Technical Services Branch, National Heart Institute, U. S. Public Health Service; formerly with the Venereal Disease Research Laboratory.

[3] U. S. Public Health Service Laboratory of Experimental Syphilis, University of North Carolina School of Public Health, Chapel Hill, N. C.

## Summary

1. The results of the various studies indicate that this lot of crystalline penicillin G was very effective in the treatment of syphilis in animals.

2. Eight hundred units per kilogram of body weight were equally effective in a 4-day or in a 14-day treatment schedule.

3. The smallest dosages used, 230 and 115 units per kilogram of body weight, were well above the $CD_{50}$ limits.

4. Variations in the potency of crystalline penicillins may have influenced the therapeutic results in this and other clinical studies.

## References

1. Arnold, R. C.; Boak, R. A.; Carpenter, C. M.; Chesney, A. M.; Fleming, W. L.; Gueft, B.; Mahoney, J. F.; Rosahn, P. D.: A joint report on a cooperative investigation of the efficacy of species of penicillin in the treatment of experimental syphilis. Am. J. Syph., Gonor. & Ven. Dis., 31: 469–475, September 1947.

2. Tests and methods of assay for antibiotic drugs. *In* 1949 Edition of Code of Federal Regulations, title 21, part 141.1, pp. 135–138 (21 CFR 141.1). Also *in* Compilation of Regulations for Tests and Methods of Assay and Certification of Antibiotic Drugs, vol. I, sec. 141.1, pp. 1–9, available by writing to the Food and Drug Administration, Federal Security Agency, Washington, D. C.

3. Cup-plate assay of penicillin concentrations in plasma—*S. lutea*. *In* Methods in Medical Research, vol. I, sec. I (Assay of Antibiotics), pp. 25–26. Chicago, 1948.

# Dehydrogenations Produced by the Reiter Spirochete[1]

**Matthew A. Bucca, Ph. D.,[2] James D. Thayer, Ph. D.;[3] Harriet B. Roberts;[4] and Bernard Tager[5]**

Information gained from studies of the metabolism of micro-organisms has served in establishing practical diagnostic tests and in revealing the nutritional requirements of the organisms and their ability to survive under various conditions. A need for fundamental studies in the problem of the biology of syphilitic infections has been indicated by such workers as Ingraham (*1*), Stokes and Beerman (*2*), and Rosahn (*3*).

Supniewski and Hano (*4*) studied the effect of the utilization of chemical compounds on the growth of a cultured strain of *Treponema pallidum* procured from Germany and concluded in part that the organism does not produce large metabolic changes. Scheff (*5*) studied the respiration of cultured spirochetes. He observed that the Klopstock and Vásárhelyi strains of *T. pallidum* may be considered true anaerobes and may decompose glucose with the production of carbon dioxide and lactic acid; no significant oxygen consumption was observed. Nelson and Mayer (*6*) applied the knowledge gained from studies on the effect of chemical and physical factors upon survival of *T. pallidum* obtained from rabbit syphilomas (*7*) as a basis for an immobilization test of syphilitic serums upon virulent *T. pallidum*.

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[1] From the Venereal Disease Research Laboratory, U. S. Marine Hospital, Staten Island, N. Y., now located at Atlanta, Ga.

[2] U. S. Public Health Service Communicable Disease Center, Virus and Rickettsia Laboratory, Montgomery, Ala.

[3] U. S. Public Health Service Laboratory of Experimental Syphilis, University of North Carolina School of Public Health, Chapel Hill, N. C.

[4] Bacteriologist, Venereal Disease Research Laboratory, U. S. Marine Hospital, Staten Island, N. Y.

[5] Veterans' Administration Hospital, Bath, N. Y.

This paper presents a study undertaken to determine the range of compounds activated by a purported avirulent strain of *T. pallidum* as determined by the Thunberg dye-reduction method.

## Methods

In order to obtain suspensions eliciting suitable reduction times, mass cultivation of the Reiter spirochete[6] was essential. Of the several mediums for the cultivation of the organism tried preliminarily, the best suspensions with respect to homogeneity and endogenous activity were obtained by growing the spirochete in a freshly prepared beef heart infusion broth containing 0.1 percent cysteine monohydrochloride. The reaction was adjusted so that the final pH was 6.5 after autoclaving at 15 pounds for 20 minutes. After addition of 10-percent Seitz-sterilized inactivated horse serum and 10-percent inoculum, the bottles were incubated anaerobically in an atmosphere of hydrogen in a Brewer anaerobic jar for a period of 3 days at 35° to 36° C.

The harvested organisms were washed twice with boiled saline solution and finally suspended in M/15 phosphate buffer (Clark and Lubs), pH 6.5. This suspension was adjusted with the use of a Lumetron photoelectric colorimeter and an M440 filter so that when diluted 1:30 a 30-percent light transmission was obtained. Purity of the culture was controlled by darkfield microscopic examination and confirmed by Gram's stain and sterility tests.

The dehydrogenase activity of the suspensions was demonstrated in principle by the method of Thunberg (*8*); Thunberg-type tubes with hollow-bulb stoppers were used. Exploratory studies directed on the serviceability of a variety of redox indicators showed that brilliant cresyl blue was well suited, judged from its comparative rapidity of reduction time as well as its reliability as a criterion of color change. This dyestuff has been previously utilized as an indicator for dehydrogenase activity of *Clostridium* by Strickland (*9*), Kocholaty and Hoogerheide (*10*), and Guggenheim (*11*).

The components of the dehydrogenase system consisted of:

| | |
|---|---|
| M/5,000 brillant cresyl blue,[1] aqueous | 1.0 ml. |
| M/15 phosphate buffer (Clark and Lubs), pH 6.5 | 1.5 ml. |
| M/10 substrate (limited by solubility), aqueous | 2.0 ml. |
| Redistilled water | 0.5 ml. |
| Spirochete suspension (in hollow stopper of tube) | 1.0 ml. |

For each series of substrates tested at one time, there were always included controls showing the endogenous rate of dehydrogenation, the sole effect of each substrate on the dye indicator, and the dextrose dehydrogenation rate. The tubes were evacuated by the use of a vacuum pump and concomitant shaking for a period of 10 minutes. It was found unnecessary to supplement the procedure by flushings with oxygen-free nitrogen. All substrates tested were obtained from commercial sources with the exception of sodium pyruvate which was prepared according to the method of Robertson (*12*). The concentration was ordinarily M/10 except in those compounds limited by the solubility factor; whenever necessary, the substrate solutions were adjusted between pH 6.0 and 7.0 with either NaOH or HCl. All tests were carried out in duplicate in a thermostatically controlled water bath at 38° C.; the duplicate reduction times of each substrate and control agreed significantly. The spirochetal suspension was tipped after an equilibration period of 10 minutes. The end point was determined by measuring the time elapsed for 90-percent reduction of the dye in each tube by matching with the color of a tube containing one-tenth the dye concentration. The observation time varied according to the endogenous control. Although aseptic technic was not observed in the conduct of the test, all checks revealed no contamination microscopically at the end of the experiment.

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[6] This organism was obtained from Dr. Margaret M. Davis, University of Texas Medical Branch at Galveston, for which acknowledgment is given.

[1] The brilliant cresyl blue used in this work was kindly donated by Dr. H. J. Conn of the Biological Stain Commission. It was a certified product from the National Aniline Division of the Allied Chemical & Dye Corp., New York City, and had a low arsenic and zinc content.

## Results

### *The Effect of Diluting the Suspension*

An experiment was made to ascertain the effect of varying the concentration of the suspension. Table 1 shows that when the amount of available enzyme (organisms) is decreased, there is a rough proportional increase in reduction time; the two finite figures observed in the endogenous dehydrogenation are likewise affected. Quastel and Wooldridge *(13)* found that the reduction time of methylene blue by a given donator is roughly inversely proportional to the quantity of *Escherichia coli* present and demonstrated this by ascertaining the *qt* values—the product of the volume of the suspension and reduction time. Similarly ascertained *qt* values listed in table 1 bear out the results depicted.

**Table 1.—*The effect of varying the concentration of the suspension***

| Concentration of standard suspension | Glucose |  | Endogenous |  |
|---|---|---|---|---|
|  | Reduction time | *qt* | Reduction time | *qt* |
|  | *Minutes* |  | *Minutes* |  |
| 1.0 ml | 15 | 15.0 | 91 | 91 |
| 0.5 ml | 30 | 15.0 | 190 | 95 |
|  |  |  | *Hours* |  |
| 0.2 ml | 78 | 15.6 | >20 | ∝ |
| 0.1 ml | 110 | 11.0 | >20 | ∝ |

### *The Effect of Varying Concentration of Substrates*

Table 2 shows that there exists no inverse proportionality between decreasing concentrations of dextrose, mannitol, and adonitol, and the reduction time.

The relative activity of the substrates tested given in table 3 was based on dextrose equal to 100 and was determined by the following formula:

$$\text{Relative activity (dextrose}=100)=\frac{\text{Reduction time of dextrose}}{\text{Reduction time of substrate}}\times 100$$

**Table 2.—*The effect of varying the concentration of the substrate***

| Concentration of substrate | Reduction time (minutes) |  |  |
|---|---|---|---|
|  | Dextrose | Mannitol | Adonitol |
| M/1 | 2 | 5 | 37 |
| M/5 | 7 | 11 | 58 |
| M/10 | 15 | 15 | 63 |
| M/100 | 51 | 39 | 69 |
| M/1,000 | 100 | 61 | 96 |

A perusal of table 3 shows that the substrates having the highest activities are oxalacetic acid, pyruvate, and *d*(+)-raffinose. Of the amino acids tested, *l*(+)-glutamic acid was dehydrogenated most actively. Substrates categorized in each of the following groups of amino acids showed good activities: Of the mono-amino-mono-carboxylic acids tested, *l*(−)-serine and *dl* methionine; of the diamino-mono-carboxylic acids tested, *dl*-citrulline, *l*(+)-arginine, *d*-arginine, and *l*(+)-ornithine; and the heterocyclic amino acid histidine. Those carbohydrates and polyhydric alcohols which served as the best hydrogen donators were *d*(+)-raffinose, sorbose, *d*-sorbitol, *d*(+)-cellobiose, and *d*(+)-melezitose. Those carbohydrates showing poor activity as substrates were: In the monosaccharide group, *d*(+)-galactose, *d*(−)-arabinose, *d*(—)-levulose, *d*(—)-ribose, and *l*(+)-arabinose; in the disaccharides, maltose, *d*(+)-lactose, and *d*(+)-trehalose; in the polyhydric alcohol group, glycerol, erythritol, *d*-mannitol, adonitol, and dulcitol; in a miscellaneous group, *l*(+)-rhamnose, salicin, inulin, and esculin. Monohydric alcohols showing the greatest substrate activities were *iso*propyl, *n*-propyl, and *iso*butyl alcohols. Methyl and ethyl alcohols were poor substrates for the Reiter spirochete. Malic and β hydroxybutyric acid were active substrates, whereas the other hydroxy-acids tested—glyceric, tartaric, and lactic—showed poor activity. Compounds best activated in the dicarboxylic acid group were adipic, pimelic, malonic, succinic, and fumaric acids; α ketoglutaric oxalic and maleic acids were poor substrates. Of the fatty acids tested, *iso*valeric, *n*-valeric, propionic, and formic acids were found to be best dehydrogenated, whereas acetate showed poor activity.

## Table 3.—*Relative rates of dehydrogenation of various compounds by the Reiter spirochete*

(*d*(+)-dextrose taken as standard and equal to 100)

| Compound | Concentration | Dextrose reduction time (minutes) | Endogenous reduction time (minutes) | Substrate reduction time (minutes) | Relative activity [1] |
|---|---|---|---|---|---|
| Oxalacetic acid | M/10 | 21.5 | 62.0 | 2.0 | 1,075.0 |
| Sodium pyruvate | M/10 | 18.5 | 81.5 | 2.8 | 672.7 |
| *d*(+)-Raffinose | M/10 | 18.0 | 250.0 | 2.8 | 654.5 |
| Sodium hippurate | M/10 | 13.8 | 130.0 | 2.5 | 550.0 |
| *d*(+)-Glucosamine HCl | M/10 | 5.5 | 54.5 | 1.0 | 550.0 |
| *Iso*propyl alcohol | M/10 | 4.5 | 50.8 | 1.0 | 450.0 |
| *n*-Propyl alcohol | M/10 | 15.0 | 90.5 | 3.5 | 428.6 |
| Sorbose | M/10 | 7.0 | 86.0 | 2.5 | 280.0 |
| Choline chloride | M/10 | 7.0 | 86.0 | 2.5 | 280.0 |
| *n*-Butyric acid | M/10 | 12.6 | 63.3 | 5.0 | 252.6 |
| *d*-Sorbitol | M/10 | 8.0 | 70.0 | 3.5 | 228.6 |
| *l*(+)-Glutamic acid | M/10 | 18.5 | 81.5 | 8.8 | 211.4 |
| *d*(+)-Cellobiose | M/10 | 8.0 | 70.0 | 4.0 | 200.0 |
| *d*(+)-Melezitose | M/10 | 5.5 | 54.5 | 3.0 | 183.3 |
| Sodium gluconate | M/10 | 5.3 | 43.0 | 3.0 | 175.0 |
| Adipic acid | M/10 | 18.0 | 250.0 | 12.0 | 150.0 |
| *d*(+)-Mannose | M/10 | 18.0 | 102.5 | 15.0 | 120.0 |
| *l*(−)-Serine | M/10 | 7.0 | 86.0 | 6.3 | 112.0 |
| *dl* Malic acid | M/10 | 7.5 | 39.0 | 7.3 | 103.4 |
| Pimelic acid | M/10 | 4.5 | 50.8 | 4.5 | 100.0 |
| *Iso*valeric acid | M/10 | 12.6 | 63.3 | 13.0 | 97.2 |
| Malonic acid | M/10 | 9.0 | 81.0 | 9.8 | 92.3 |
| Sodium sulfanilate | M/10 | 4.5 | 50.8 | 5.5 | 81.8 |
| Phenylacetic acid | M/10 | 7.5 | 39.0 | 9.3 | 81.1 |
| *dl*-Citrulline | M/10 | 8.0 | 78.5 | 10.0 | 80.0 |
| Succinic acid | M/10 | 24.0 | 111.5 | 31.5 | 76.2 |
| *l*(+)-Arginine HCl | M/10 | 7.0 | 86.0 | 9.3 | 75.7 |
| β Hydroxybutyric acid | M/10 | 4.5 | 50.8 | 6.0 | 75.0 |
| *d*-Arginine HCl | M/10 | 7.0 | 86.0 | 9.8 | 71.8 |
| *dl*-Methionine | M/10 | 14.0 | 150.0 | 20.3 | 69.1 |
| *Iso*butyl alcohol | M/10 | 4.5 | 50.8 | 6.8 | 66.7 |
| Fumaric acid | M/10 | 9.0 | 81.0 | 14.3 | 63.2 |
| *n*-Valeric acid | M/10 | 12.6 | 63.3 | 20.0 | 63.2 |
| Creatinine | M/10 | 7.5 | 39.0 | 12.3 | 61.2 |
| Sodium propionate | M/10 | 58.0 | 284.5 | 97.5 | 59.5 |
| Glutaric acid | M/10 | 12.6 | 63.3 | 21.8 | 58.1 |
| Sodium formate | M/10 | 21.5 | 62.0 | 37.0 | 58.1 |
| *l*(+)-Ornithine HCl | M/10 | 4.5 | 50.8 | 8.0 | 56.3 |
| Betaine | M/10 | 12.6 | 63.3 | 22.5 | 56.1 |
| Histidine HCl | M/10 | 7.0 | 86.0 | 13.3 | 52.8 |
| *l*(+)-Alanine | M/10 | 19.3 | 100.5 | 41.0 | 47.0 |
| Histamine | M/10 | 7.0 | 39.0 | 16.0 | 46.9 |
| Calcium caseinate percent | 1.0 | 5.3 | 43.0 | 12.5 | 42.0 |
| Sodium acetate | M/10 | 9.0 | 81.0 | 21.5 | 41.9 |
| *d*(+)-Xylose | M/10 | 18.0 | 102.5 | 43.0 | 41.9 |
| *l*-Asparagine | M/10 | 8.0 | 78.5 | 19.3 | 41.6 |
| *dl*-alpha Alanine | M/10 | 13.8 | 130.0 | 34.0 | 40.0 |
| *l*(−)-Leucine | M/20 | 8.0 | 78.5 | 21.3 | 37.6 |
| Maltose | M/10 | 6.3 | 155.0 | 17.0 | 36.8 |
| Creatine | M/10 | 7.0 | 86.0 | 19.5 | 35.9 |
| *dl*-Ornithine HCl | M/10 | 7.0 | 86.0 | 19.5 | 35.9 |
| Sucrose | M/10 | 24.0 | 111.5 | 69.5 | 34.5 |
| Glycocoll | M/10 | 21.5 | 62.0 | 68.0 | 31.6 |
| *l*(+)-Valine | M/10 | 58.0 | 284.5 | 185.0 | 31.4 |
| Guanidine HCl | M/10 | 5.5 | 54.5 | 18.3 | 31.0 |
| α Ketoglutaric acid | M/10 | 4.5 | 50.8 | 15.3 | 29.5 |
| Glyceric acid | M/10 | 5.0 | 148.0 | 17.0 | 29.4 |
| Glycyl-glycine | M/10 | 5.3 | 43.0 | 19.5 | 26.9 |
| Ethyl alcohol | M/10 | 6.3 | 155.0 | 23.5 | 26.6 |

See footnotes at end of table, p. 10.

**Table 3.—*Relative rates of dehydrogenation of various compounts by the Reiter spirochete*—Continued**

(*d*(+)-dextrose taken as standard and equal to 100)

| Compound | Concentration | Dextrose reduction time (minutes) | Endogenous reduction time (minutes) | Substrate reduction time (minutes) | Relative activity [1] |
|---|---|---|---|---|---|
| Glycl-*l*-leucine | M/10 | 5.3 | 43.0 | 19.8 | 26.6 |
| *d, l*-Leucyl-glycyl-glycine | M/10 | 5.3 | 43.0 | 20.0 | 26.3 |
| *d*(+)-Melibiose | M/10 | 8.0 | 70.0 | 30.5 | 26.2 |
| Acetone | M/10 | 5.3 | 43.0 | 20.5 | 25.6 |
| *i*-Inositol | M/10 | 9.0 | 81.0 | 36.0 | 25.0 |
| Sodium oxalate | M/10 | 6.3 | 155.0 | 25.3 | 24.8 |
| Glycerol | M/10 | 24.0 | 111.5 | 94.0 | 24.5 |
| *d*(+)-Galactose | M/10 | 8.0 | 70.0 | 33.0 | 24.2 |
| Nicotinamide | M/10 | 5.3 | 43.0 | 22.5 | 23.3 |
| *dl*-Glutamic acid | M/50 | 4.0 | 48.5 | 17.3 | 23.2 |
| Sodium citrate | M/10 | 6.3 | 155.0 | 27.0 | 23.1 |
| *l*(−)-Tyrosine | M/300 | 19.3 | 100.5 | 85.0 | 22.6 |
| *l*(−)-Phenylalanine | M/100 | 9.5 | 58.0 | 42.5 | 22.4 |
| Taurine | M/10 | 5.3 | 43.0 | 23.5 | 22.3 |
| *d*(+)-Lactose | M/10 | 5.0 | 148.0 | 23.3 | 21.5 |
| Calcium pentothenate | M/25 | 5.3 | 43.0 | 25.1 | 20.9 |
| *d*(−)-Arabinose | M/10 | 18.0 | 250.0 | 63.0 | 20.6 |
| Lactic acid | M/10 | 6.3 | 155.0 | 31.0 | 20.2 |
| *dl*-Threonine | M/10 | 14.0 | 150.0 | 70.5 | 19.9 |
| *dl*-Aspartic acid | M/50 | 13.8 | 130.0 | 69.5 | 19.8 |
| *l*(+)-Rhamnose | M/10 | 8.0 | 70.0 | 42.0 | 19.0 |
| Methyl alcohol | M/10 | 18.0 | 102.5 | 95.0 | 18.9 |
| Uracil | M/10 | 18.0 | 102.5 | 95.0 | 18.9 |
| Sodium tartrate | M/10 | 5.0 | 148.0 | 26.8 | 18.7 |
| Nucleic acid (yeast) [2] percent | 1.0 | 5.3 | 43.0 | 28.3 | 18.6 |
| *d*(−)-Levulose | M/10 | 5.0 | 148.0 | 27.0 | 18.5 |
| Salicin | M/10 | 14.0 | 150.0 | 76.5 | 18.3 |
| Desoxyribonucleic acid [2] percent | 0.125 | 5.3 | 43.0 | 29.0 | 18.1 |
| Sodium acrylate | M/10 | 4.5 | 50.8 | 25.0 | 18.0 |
| Maleic acid | M/10 | 5.0 | 148.0 | 27.8 | 18.0 |
| Acetaldehyde | M/10 | 14.8 | 90.5 | 82.0 | 18.0 |
| α Glycerophosphate (calcium salt) | M/30 | 8.0 | 78.5 | 45.3 | 17.7 |
| *d*(−)-Ribose | M/10 | 5.5 | 54.5 | 31.5 | 17.5 |
| Erythritol | M/10 | 4.5 | 50.8 | 26.0 | 17.3 |
| *d*(+)-Trehalose | M/10 | 8.0 | 70.0 | 46.5 | 17.2 |
| *p*-Aminobenzoic acid | M/10 | 4.0 | 48.5 | 24.5 | 16.3 |
| *l*(+)-Lysine HCl | M/10 | 5.0 | 148.0 | 32.0 | 15.6 |
| *l*(−)-Cystine | M/6,000 | 7.0 | 86.0 | 45.5 | 15.4 |
| *dl*-Valine | M/10 | 18.0 | 250.0 | 118.0 | 15.3 |
| Inulin | M/500 | 13.8 | 130.0 | 89.8 | 15.3 |
| Lithium lactate | M/10 | 4.0 | 48.5 | 27.0 | 14.8 |
| *l*(−)-Proline | M/10 | 13.8 | 130.0 | 96.3 | 14.3 |
| Urea | M/10 | 5.5 | 54.5 | 41.0 | 13.4 |
| Adonitol | M/10 | 5.5 | 54.5 | 41.5 | 13.3 |
| *dl*-Tryptophane | M/400 | 9.0 | 81.0 | 68.0 | 13.2 |
| *d*-Mannitol | M/10 | 18.0 | 250.0 | 144.0 | 12.5 |
| Dulcitol | M/10 | 8.0 | 70.0 | 64.0 | 12.5 |
| *l*(+)-Arabinose | M/10 | 18.0 | 250.0 | 146.0 | 12.3 |
| Nicotinic acid | M/100 | 5.3 | 43.0 | 45.0 | 11.7 |
| *dl*-Isoleucine | M/40 | 5.3 | 43.0 | 45.0 | 11.7 |
| Xanthine | M/8,000 | 9.0 | 81.0 | 88.5 | 10.2 |
| *l*(−)-Hydroxyproline | M/10 | 5.0 | 148.0 | 49.5 | 10.1 |
| *dl*-Leucine | M/20 | 14.0 | 150.0 | 150.0 | 9.3 |
| β Alanine | M/10 | 4.0 | 48.5 | 43.5 | 9.2 |
| *l*(+)-Aspartic acid | M/50 | 4.0 | 48.5 | 44.5 | 9.0 |
| Uric acid | M/4,500 | 9.0 | 81.0 | 101.3 | 8.9 |
| *dl*-Norleucine | M/20 | 14.0 | 150.0 | 160.0 | 8.8 |
| Thymine | M/50 | 4.5 | 50.8 | 51.0 | 8.8 |
| Sodium oleate | M/2,000 | 4.0 | 48.5 | 49.0 | 8.5 |
| *l*(−)-Tryptophane | M/400 | 4.5 | 50.8 | 53.5 | 8.4 |
| Esculin | M/400 | 18.0 | 250.0 | 223.0 | 8.1 |
| *dl*-Phenylalanine | M/100 | 4.0 | 48.5 | 50.0 | 8.0 |
| Sodium salicylate | M/10 | 4.0 | 48.5 | 75.0 | 5.3 |

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[1] See text.

[2] A blue-green color was imparted to the mixture upon the addition of these compounds. Magnesium ribonucleate (1.0 percent) behaved similarly. Formaldehyde (M/10), magnesium ribonucleate (1.0 percent), and sodium glycocholate (M/10) exerted strong inhibitory effects on the dehydrogenase system. In addition, sodium glycocholate (M/10) affected the morphology of the organisms.

## Discussion

One of the problems which directly affected the results of these experiments was the observation that the dextrose and endogenous controls varied significantly from day to day, despite standardized procedures followed during the course of the entire study. Guggenheim had also observed that dehydrogenase activity of individual suspensions of *Clostridium* (*11*) and of *Eberthella typhosa* (*14*) varied despite observance of carefully controlled conditions. Since the endogenous and glucose reduction time controls differed broadly from experiment to experiment, the experimental data in table 3 were subjected to statistical study with the object of securing a better coordinated picture.[7] Initially an attempt to relate the endogenous reduction time with both the corresponding substrate and dextrose reduction times was made by introducing an arithmetical correction to the experimental data obtained for the substrate and dextrose reduction times before applying the respective figures to the relative activity formula. With certain exceptions, the array of corrected relative activities of the compounds tested was portrayed in approximately the same fashion as the uncorrected relative activities.

The best results were secured when beef heart-cysteine-horse serum medium was employed, despite the source variations inherent in the use of different batches of beef hearts and horse blood. This was manifested in the realization of a more abundant yield of organisms, in a marked decrease of insoluble dark material present in the final washed suspension, and in the preparation of a more readily homogenized suspension than when other culture mediums were tried, such as dehydrated and noncommercially prepared anaerobic types of mediums containing thioglycolate. The effect of the constituents of the culture mediums for the growth of streptococci on dehydrogenase activity is given by the work of Wood and Gunsalus (*15*).

Repeated washings of the harvested cells and storage of the standardized suspensions under anaerobic conditions at room or low temperatures did not appear to lengthen the endogenous reduction time nor was the dextrose reduction time decreased or stabilized from run to run. It was our general experience that with a decrease in endogenous reduction time, there was also a substantial decrease in the dextrose reduction time of the Reiter spirochete. Endogenous and glucose reduction times were both perceptibly decreased when 0.5 percent yeast extract-saline or 0.5 percent beef extract-saline solutions in concentrations of 0.1 ml. were added to the digest. The limitations and problems pertaining to certain aspects of endogenous respiration, with particular emphasis to *Pseudomonas aeruginosa*, has been given by Norris, Campbell, and Ney (*16*).

The relationship existing between the ability of an organism to activate a given substrate and the ability of that compound to serve as a nutrilite for the propagation of the organisms is an intriguing subject. Quastel, as early as 1925 (*17*), pointed out the underlying conditions existing between the ability of *E. coli* to dehydrogenate a given compound and the ability of that compound to serve as a nutrilite. Eagle and Steinman (*18*) found that arginine, pyruvic acid, ethanol, sorbitol, cystine, and dextrose, among other compounds, exhibit growth-promoting properties for the Reiter spirochete. Our experiments show that the afore-mentioned substances do serve as donators, although in various intensities. It should be pointed out, however, that the order of relative rates of oxidation of substrates may be different when a redox indicator is used as a hydrogen acceptor than when oxygen is selected as the hydrogen acceptor (Wilson (*19*); Nunheimer and Fabian (*20*)).

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[7] Acknowledgment is made to Margaret R. Zwally and to Elizabeth B. Greenleaf for the statistical study and for the formulation and tabulation of the experimental results.

## Summary

The dehydrogenase activity of washed suspensions of the Reiter spirochete was investigated by the dye-reduction technic.

The Reiter spirochete is able to activate a broad variety of biologically interesting substrates, including amino acids, carbohydrates, monohydric, and polyhydric alcohols, as well as fatty and dicarboxylic acids.

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# CURRENT NOTES AND REPORTS

### VD Seminar Scheduled for Cleveland

A three-region venereal disease seminar is tentatively scheduled for February 20–21 in Cleveland, Ohio. Regions IV (Kentucky, Michigan, and Ohio), V (Illinois, Indiana, Minnesota, and Wisconsin), and VII (Iowa, Kansas, Missouri, Nebraska, North Dakota, and South Dakota) joined to hold last year's seminar in Chicago.

State health officers, venereal disease control officers, and Federal and State public health workers in these regions are expected to attend. The meeting is intended to acquaint field workers with the latest methods used in controlling venereal disease.

### "With These Weapons"

A popular, short film has been revised to bring the story of the treatment of syphilis up to date. "With These Weapons" (16-mm. sound, black and white, running time 10 minutes) briefly and effectively tells the facts about syphilis and its relation to personal, family, and community health.

Both documentary and dramatic technics are employed, with narration by David Ross, well-known radio announcer, who was the narrator for the original 1939 production. New scenes have been inserted showing penicillin therapy, and an entirely new sound track has been added.

Suitable for mixed audiences from high school age and up, the film may be obtained from the American Social Hygiene Association, 1790 Broadway, New York 19, N. Y.

### St. Louis Story

A new "VD Clip Sheet" has been assembled from newspaper stories used in the St. Louis campaign against venereal disease which began last April. A full account of the project activity is given in the dozens of stories and pictures.

Copies of the "VD Clip Sheet, St. Louis Edition" are available upon request to Dr. Theodore J. Bauer, Chief, Division of Venereal Disease, U. S. Public Health Service, Washington 25, D. C.

# CURRENT LITERATURE

ACTA MED. IUGOSLAV., BELGRADE

**The electric properties of lipid antigen particles. M. Piantanida and H. Becker. Acta med. Iugoslav., 4 : 11–48, Fasc. 1–2, 1950.**

An introductory discussion of some fundamental colloidal and serologic aspects of the flocculation test for syphilis is given. The effect of surface charges on the serologic behavior of lipid antigens was measured by means of the serum dilution method and electrophoretically. Results are reported in detail.

AM. HEART J., ST. LOUIS

**Sudden death due to embolic occlusion of both coronary ostia in syphilitic cardiovascular disease. B. W. Volk, L. E. Meiselas, and Mendel Jacobi. Am. Heart J., 40 : 316–321, Aug. 1950.**

The literature is reviewed and case reports are presented of a 30-year-old Negro woman and a 50-year-old white man who had syphilitic aortitis with mural thrombi, complicated by bilateral coronary embolization. These cases, observed at the Office of the Chief Medical

### Am. Heart J., St. Louis—Continued

Examiner of the City of New York, bring the total number of such cases reported to 12.

### Am. J. Clin. Path., Baltimore

Examination of cerebrospinal fluid and blood. Simplified methods derived from the quantitative gold reaction. Carl Lange, John K. Miller, and Albert H. Harris. Am. J. Clin. Path., 20 : 872–876, Sept. 1950.

Two simplified technics for the colloidal gold test are described. Both employ the standardized reagents and controls used in the quantitative colloidal gold reaction. The quantitative test is highly recommended in neurosyphilis.

### Am. J. Med., New York

Effect of schedule of administration on the therapeutic efficacy of penicillin. Importance of the aggregate time penicillin remains at effective bactericidal levels. Harry Eagle, Ralph Fleischman, and Arlyne D. Musselman. Am. J. Med., 9 : 280–299, Sept. 1950.

A review of the literature is given. Additional data from studies at the National Institutes of Health, Bethesda, Md., are presented to reinforce the thesis that the major determinant factor in the therapeutic activity in penicillin is the aggregate time, not necessarily continuous, for which the drug remains at bactericidal levels.

Treatment of neurosyphilis. Conference on therapy. Am. J. Med., 9 : 373–382, Sept. 1950.

A transcript of Cornell University Medical College and New York Hospital conference is given. The following special problems were discussed: When the patient with syphilis is free of the danger of developing neurosyphilis; how long the patient with neurosyphilis needs to be under observation; clinical and serologic criteria of cure; behavior of syphilis acquired in the same exposure as gonorrhea; reasons for discordant results from different clinics; special aspects of tabes, paresis, and optic atrophy; Herxheimer reaction; various forms of artificial fever and the dangers of malaria fever therapy.

### Am. J. Obst. & Gynec., St. Louis

Nongonorrheal vulvovaginitis due to gram-negative intracellular diplococci. John Dale Weaver. Am. J. Obst. & Gynec., 60 : 257–260, Aug. 1950.

Among 1,014 children at the Austin State School in Texas who received a gynecologic examination, inflammatory changes in the genital tract were found in 262. Only 4 of these had gonorrhea. Twelve had a vulvovaginitis from which gram-negative diplococci were found, the organism being *Neisseria sicca*. Gross findings in the tissues as well as stained bacterial smears appeared the same as those of gonorrhea, but cultures and fermentation tests identified the organism.

A clinical evaluation of the Falk procedure. Charles R. Freed and Robert A. Kimbrough. Am. J. Obst. & Gynec., 60 : 416–421, Aug. 1950.

At the Gynecologic Department of the Graduate Hospital, University of Pennsylvania, 62 patients with chronic recurrent gonorrheal salpingitis received a simple and safe operative treatment known as the Falk procedure. Clinical relief was obtained in 95 percent of the patients treated.

### Am. J. Pub. Health, New York

Public health practices in Germany under U. S. occupation (1945–1949). Brief historical review. Walter R. deForest. Am. J. Pub. Health, 40 : 1072–1076, Sept. 1950.

Rapid increase in venereal disease, resulting indirectly from homeless wanderers, lack of sanitary conditions and supplies, and lack of drugs for treatment, was one of the problems affecting the health of occupation forces. Methods of dealing with this problem are discussed. Decrease of syphilis from 30 per 10,000 population to 11.2 and of gonorrhea from 90 to 23.0 was brought about largely through importation and use of penicillin and setting up of 96 venereal disease treatment hospitals.

### Am. J. Syph., Gonor. & Ven. Dis., St. Louis

Is venereal disease no longer a problem? E. Gurney Clark. Am. J. Syph., Gonor. & Ven. Dis., 34 : 401–404, Sept. 1950.

From the present criteria control is not imminent, although progress has been made. The problem is one for the health officer and the community, as well as the private physician.

Studies on the relationship of treponemal antibody to probable biologic false positive serologic tests for syphilis. Charles F. Mohr, Joseph Earle Moore, Robert A. Nelson, and Justina H. Hill. Am. J. Syph., Gonor. & Ven. Dis., 34: 405–409, Sept. 1950.

Patients for this study done at Johns Hopkins Hospital included 126 treated for late syphilis who were used as controls, 67 with a probable diagnosis of late latent syphilis, and 63 with a probable diagnosis of biologic false-positive reaction. From results it is shown that the treponemal immobilization test is highly specific. Negative tests occurred in 89 percent of those classified as biologic false-positive reactors and in 24 percent of those classified as late latent.

Evaluation of the treatment of early syphilis with arsphenamine and heavy metal. Robert C. Thompson and Dudley C. Smith. Am. J. Syph., Gonor. & Ven. Dis., 34: 410–419, Sept. 1950.

Evaluation includes 771 patients treated between 1921 and 1933 at the University of Virginia Hospital and Clinic. Arsphenamine, mercury, and bismuth were used in treatment. In a group of 169 followed for 16 to 29 years, there was a 90.5-percent cure. Present-day trend to minimize latency and treat syphilis with short courses results in more infectious relapses in early cases.

The treatment of primary and secondary syphilis with four new schedules. A preliminary report on 500 cases. Lee J. Alexander, Arthur G. Schoch, and Walter B. Mantooth. Am. J. Syph., Gonor. & Ven. Dis., 34: 420–424, Sept. 1950.

Since April 1947, of the four schedules used at the Dallas Syphilis and Venereal Disease Clinic, the one employing four injections at weekly intervals of 1.2 million units procaine penicillin G in oil with 2 percent aluminum monostearate proved superior. All four schedules are described and tabulations given showing number of patients treated with each.

The synergistic action of penicillin in combination with arsenic and bismuth in early syphilis. A report of 198 patients treated with 2.4 million units of sodium penicillin combined with arsenic and bismuth. Frederick Plotke, Jack Rodriquez, and George X. Schwemlein. Am. J. Syph., Gonor. & Ven. Dis., 34: 425–430, Sept. 1950.

From April to August 1946, 198 patients at the Chicago Intensive Treatment Center were treated with amorphous sodium penicillin in distilled water, Clorarsen, and bismuth subsalicylate in oil over a period of 7½ days. Clinical evidence showed synergistic activity of these drugs. Cumulative failure rate after 12 to 15 months was 15.4 percent and 20.0 percent after 24 to 27 months.

Treatment of early syphilis with penicillin and bismuth subsalicylate: Daily injection of 500,000 units of penicillin G in sodium chloride solution for twenty consecutive days and ten to twenty doses of bismuth subsalicylate at the rate of two a week. Second report. V. Pardo-Castello and Osvaldo A. Pardo. Am. J. Syph., Gonor. & Ven. Dis., 34: 431–435, Sept. 1950.

Of 91 patients treated in Cuba, all were clinically negative at the end of 60 days to 2 years. Of these, 79 are still seronegative. The failure rate of 1.2 percent shows the schedule to be effective. The authors conclude that addition of bismuth subsalicylate to any schedule enhances its therapeutic value and that constant blood concentrations of penicillin are not necessary for effective treatment.

Treatment of syphilis with aureomycin. A preliminary report. Sidney Olansky, Ralph B. Hogan, S. Ross Taggart, Gerda S. Landman, and Eugene D. Robin. Am. J. Syph., Gonor. & Ven. Dis., 34: 436–442, Sept. 1950.

From results of treatment of 108 patients at Gallinger Hospital, Washington, D. C., it was shown that aureomycin was therapeutically active in syphilis. Best results were obtained after administration of 60 mg. per kilogram per day for 8 days. Since the Jarisch-Herxheimer phenomenon is milder and less frequent after aureomycin than after penicillin administration, the use of aureomycin in treatment of central nervous system or cardiovascular syphilis is indicated as valuable.

Oral treatment of neurosyphilis with aureomycin. Robert R. Kierland and Paul A. O'Leary. Am. J. Syph., Gonor. & Ven. Dis., 34 : 443–452, Sept. 1950.

Of 15 patients treated at Mayo Clinic, 12 completed therapy and are reported in detail. Dosage varied, but 60 gm. given in divided doses of 2 to 4 gm. daily appeared sufficient for a single course of therapy. Results achieved are equivalent to those of penicillin therapy. In all but one patient there was satisfactory and rapid clinical improvement.

Phenomena of disease in rabbits fed cholesterol and inoculated with *Treponema pallidum*. II. Infectivity of blood. Chester N. Frazier, Arlington Bensel, and Charles S. Keuper. Am. J. Syph., Gonor. & Ven. Dis., 34 : 453–459, Sept. 1950.

Infectivity of blood was tested in 42 rabbits from 154 to 1,117 days after inoculation with the Nichols strain of *Treponema pallidum*. In 19, the blood was infectious on transfer to normal rabbits from 154 to 930 days after inoculation. Blood of 4 rabbits with negative serologic test at time of transfer transmitted the infection.

The value of synthetic (dimyristoyl) L-*a*-lecithin as an antigen component with cardiolipin in the serodiagnosis of syphilis. Preliminary report. B. S. Kline. Am. J. Syph., Gonor. & Ven. Dis., 34 : 460–467, Sept. 1950.

Mixtures of 9, 10, 11, and 12 parts of synthetic (dimyristoyl) L-*a*-lecithin to 1 part cardiolipin gave results similar in sensitivity and specificity to those of optimal cardiolipin antigens with natural lecithin. Over 6,300 slide tests were performed.

Are ninth-day erythema and hemorrhagic encephalitis in patients treated with arsenicals parts of one and the same syndrome? Fritz E. Reymann. Am. J. Syph., Gonor. & Ven. Dis., 34 : 468–475, Sept. 1950.

From a review of the literature and observations of his own, the author suggests that ninth-day erythema is a syndrome comprising both cutaneous and noncutaneous manifestations, including hemorrhagic encephalitis.

A pilot study of the Navy's educational program on venereal disease. I. Sailors' opinions about the effectiveness of the program. Charles L. Vaughn and Albert D. Freiberg. Am. J. Syph., Gonor. & Ven. Dis., 34 : 476–480, Sept. 1950.

To determine effectiveness of the program, 200 Navy enlisted men (100 with history of venereal disease and 100 without any history) were interviewed. The movie appeared to be the most effective medium, while pamphlets rated least effective.

A pilot study of the Navy's educational program on venereal disease. II. Some attitudes and practices which hinder effective control by educational measures. Charles L. Vaughn and Albert D. Freiberg. Am. J. Syph., Gonor. & Ven. Dis., 34 : 481–485, Sept. 1950.

By questioning enlisted men as to sexual activity, it is shown that the Navy program has not affected frequency of sexual relations. The spur-of-the-moment nature of sexual activity, complicated by drinking in some cases, militates against effective control.

A pilot study of the Navy's educational program on venereal disease. III. Suggestions for improving the program. Charles L. Vaughn and Albert D. Freiberg. Am. J. Syph., Gonor. & Ven. Dis., 34 : 486–489, Sept. 1950.

Educational measures such as movies, talks, posters, and pamphlets are valuable. Their value could be improved, however, by tighter control over their administration, by pointing them specifically to those groups prone to contract venereal disease, and by better education about venereal disease before entering the Navy.

The use of Benadryl in the prevention of reactions to BAL. Howard L. Holley. Am. J. Syph., Gonor. & Ven. Dis., 34 : 490–492, Sept. 1950.

Benadryl, given shortly before the injection of BAL, may lessen the intensity or prevent side effects of BAL. Case histories are presented showing use of Benadryl.

AM. J. TROP. MED., BALTIMORE

A simplified casein hydrolysate-serum medium for the cultivation of *Trichomonas vaginalis*. J. Jerry Lash. Am. J. Trop. Med., 30 : 641–642, Sept. 1950.

A simplified medium is described. This medium is more easily manufactured, contains fewer constituents than a previously described formula, and adequately supports the growth of trichomonads, as shown in over 160 subcultures.

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ANN. INT. MED., LANCASTER

The bactericidal action of penicillin in vivo: The participation of the host, and the slow recovery of the surviving organisms. Harry Eagle, Ralph Fleischman, and Arlyne D. Musselman. Ann. Int. Med., 33: 544–571, Sept. 1950.

The rate at which streptococci and pneumococci were killed by penicillin in vivo approximated their rate of death in vitro. Rate of bactericidal action fell sharply as soon as the penicillin fell to ineffective levels.

Antibiotics: Yesterday, today, tomorrow. Chester S. Keefer. Ann. Int. Med., 33: 582–589, Sept. 1950.

Prior to discovery of antibiotics, the most effective agents were the arsenicals, sulfonamides, and specific antiserums. Antibiotics are discussed as to mode of action, synergistic effects, specific diseases treated with them, and hypersensitivity. Antibiotics in order of discovery are: tyrothricin, penicillin, streptomycin, bacitracin, polymyxin, aureomycin, Chloromycetin, neomycin, and terramycin.

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ARCH. DERMAT. & SYPH., CHICAGO

Outcome of pregnancies of women treated with aqueous penicillin for early infectious syphilis. Prevention of prenatal syphilis. Herman N. Bundesen, Jack Rodriquez, Hans C. S. Aron, and Belle F. Korman. Arch. Dermat. & Syph., 62: 230–236, Aug. 1950.

Study is based on outcome of 203 pregnancies of 147 syphilitic women treated at the Chicago Intensive Treatment Center. Of 78 living infants delivered of women treated with 4,800,000 units of aqueous crystalline penicillin G during 7½ days, there were no cases of congenital syphilis. Results were not so favorable when smaller amounts of aqueous amorphous penicillin were given over a 15-day period.

Streptomycin treatment of granuloma inguinale. Harry Pariser, Stanley Z. Goldberg, and George H. Mitchell. Arch. Dermat. & Syph., 62: 261–264, Aug. 1950.

Of 76 patients hospitalized at Hampton Roads Medical Center, Norfolk, Va., and followed for 1 to 20 months, 61 responded to one course of streptomycin, while 15 were re-treated. Thus, lesions of 80 percent of the patients healed under treatment of 18 mg. streptomycin given in divided doses of 0.6 gm. every 4 hours over a 5-day period.

Hypoallergenic penicillin in oil. S. William Simon and Milton D. Feldman. Arch. Dermat. & Syph., 62: 314–318, Aug. 1950.

Use of doxylamine and penicillin in oil in treatment of over 70 patients with various infections, including syphilis, is presented. This combination is superior even to aqueous solutions in preventing reactions to penicillin.

Reiter's disease: a case successfully treated with aureomycin. Harry Korb and Ethan Allan Brown. Arch. Dermat. & Syph., 62: 381–394, Sept. 1950.

Case history of a 20-year-old patient is presented. The disease, which did not respond to treatment with sulfonamides and penicillin, presented a complete remission of urethral, conjunctival, and joint symptoms when aureomycin was given orally in doses of 50 to 100 mg. per kilogram for 3 days.

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ARCH. INT. MED., CHICAGO

Gastroenterology. A partial review of the literature from July 1948 to July 1949. Joseph B. Kirsner, Walter Lincoln Palmer, William E. Richetts, Julian W. Buser, and Homer C. Marshall. Progress in internal medicine. Arch. Int. Med., 86: 443–486, Sept. 1950.

In this review of literature syphilis of the stomach is discussed. Among 3,066 cases of peptic ulcer observed in 16 years, 52 (1.7 percent) were of syphilitic origin. Decreased acidity or anacidity was noted in 42. Treatment with arsphenamine produced considerable improvement, even after small amounts had been given. Except in three instances in which massive hemorrhage necessitated operation, the ulcers healed completely.

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BRIT. M. J., LONDON

Chemotherapy of venereal diseases. Brit. M. J., No. 4674: 351–352, Aug. 5, 1950.

Report of annual meeting of the British

Brit. M. J., London—Continued

Medical Association, July 1950, includes discussion on uses and abuses in treatment, treatment schedules, dosages, and incidence among troops in Europe.

Refresher course for general practitioners. Chemotherapy. I. Administration of penicillin. Lawrence P. Garrod. Brit. M. J., No. 4676 : 453–455, Aug. 19, 1950.

Therapeutic action, absorption and excretion, treatment by intramuscular injection, slowly absorbed preparations, oral administration, and local administration of penicillin are discussed.

### Bull. Acad. Med. Cleveland, Cleveland

The concept of the public health nurse. Cleveland Division of Health. Carrie E. Lewis. Bull. Acad. Med. Cleveland, 9 : 7–8, 20, Sept. 1950.

The part played by the nurse in promoting better community health is discussed. In venereal disease control, the nurse aids in finding contacts and unsuspected cases and by keeping the known cases under active treatment.

### California's Health, San Francisco

Status of venereal disease control in California. A. Frank Brewer. California's Health, 8 : 25–27, Aug. 31, 1950.

Review shows the trend of reported cases of syphilis and gonorrhea has been downward from 1938 to 1949. Case finding is the key of the control program. Interviewing technics are of paramount importance in the program.

### Chicago M. Soc. Bull., Chicago

Eye changes commonly seen in general practice. Derrick Vail. Chicago M. Soc. Bull., 53 : 9–14, July 1, 1950.

In this general review consideration is given to changes in the eye caused by various infections, including those due to gonorrhea and syphilis.

Modern therapy in syphilis. Arthur C. Curtis. Chicago M. Soc. Bull., 53 : 49–50, July 22, 1950.

In this article, read before the Sixth Clinical Conference of the Chicago Medical Society, March 2, 1950, the use of penicillin and the newer antibiotics in treating syphilis in its various stages is reviewed. Dosage schedules and follow-up measures are presented.

Congenital syphilis down 85 percent. Chicago M. Soc. Bull., 53 : 65, July 29, 1950.

The Chicago Health Department reported that the procedure for treating expectant syphilitic mothers has reduced the infection of unborn babies with the disease by 85 percent in this city in the last 5 years. The plan of treatment for infected pregnant women is briefly outlined.

### Chron. World Health Organ., Geneva

Venereal diseases. Third World Health Assembly. Chron. World Health Organ., 4 : 212, Aug. 1950.

One antivenereal disease demonstration team will continue to operate in Europe, one in Egypt, and one in India during 1951. The International Serodiagnostic Laboratory Conference to be held in 1951 will bring together authors of tests from all parts of the world, and will offer an opportunity for comparing the efficiency and efficacy of various methods for serodiagnosis of syphilis.

### Connecticut Health Bull., Hartford

Plans for joint action against congenital syphilis. Henry P. Talbot. Connecticut Health Bull., 64 : 239–242, Sept. 1950.

Five basic procedures recommended by the United States Public Health Service and the Children's Bureau in a concerted drive to find and treat syphilis in expectant mothers and their newborn are listed. Provisions of Connecticut State laws requiring prenatal blood tests are discussed.

### Delaware State M. J., Farnhurst

Psychoses in the Negro. A preliminary study. S. P. Ivins. Delaware State M. J., 22 : 212–213, Aug. 1950.

In this study, which is the result of tabulating hospital statistics and working out the percentage of Negroes in the total for each of the diagnostic groups, it was found that the incidence of psychoses among the Negroes of the State of Delaware is almost twice that among the whites. Alcoholic psychoses and central nervous system syphilis are the most

### Delaware State M. J., Farnhurst—Con.

prevalent causes for admission and are about 3.5 times more frequent in Negroes than in whites.

### Health, Madison

The administrative development of the State Board of Health. Ernest B. St. Aubin. Health, 9: 32–35, July–Aug. 1950.

In 1913 the legislature of Wisconsin made venereal disease reportable and set aside $1,500 annually for the prevention of ophthalmia in infants. Venereal disease control program got under way in 1919 and was the first program to be supported on a matched fund basis under the Chamberlain-Kahn Act.

### Illinois M. J., Chicago

Penicillin in the treatment of congenital syphilis. Noel G. Shaw. Illinois M. J., 98: 193–195, Sept. 1950.

The report deals with 36 infants and children treated with penicillin G or with procaine penicillin from 1945 to the present time at two Children's Syphilis Clinics of the University of Illinois and the Central Free Dispensary of Presbyterian Hospital, Chicago. Treatment schedules, dosages, and results for each type of therapy and according to age groups are given.

### Indian M. Gaz., Calcutta

Streptomycin in syphilis. B. B. Gokhale and S. N. Ranade. Indian M. Gaz., 85: 253–255, June 1950.

Results of treatment of 12 patients made the authors feel that streptomycin should not be the drug of choice for acute gonorrhea if a concomitant syphilitic infection is suspected, unless the patient can be followed up for 3 to 6 months.

### J. Am. M. Women's A., Nashville

Granuloma inguinale treated by vulvectomy and streptomycin. Report of four cases. Mary DeWitt Petitt and Carmen C. Thomas. J. Am. M. Women's A., 5: 361–364, Sept. 1950.

Four cases are presented to show that granuloma inguinale offers a very hopeful prognosis if diagnosis is made early and modern antibiotic therapy is employed. In the recurrent or neglected case, where distortion of the external genitalia has become a serious problem to the patient, surgery in addition to antibiotic therapy will give successful results.

### J. Am. Pharm. A. (Scient. Ed.), Washington

Aureotracin: A combination of aureomycin and bacitracin. Henry Welch, W. A. Randall, and C. W. Price. J. Am. Pharm. A. (Scient. Ed), 39: 483–485, Sept. 1950.

An insoluble compound of bacitracin and aureomycin is described in which antibacterial properties of both are preserved. In combination, bacitracin is less nephrotoxic than the soluble drug. The new drug affords prolonged blood concentration when injected into the animal body and can be used with safety in man.

### J. Exper. Med., New York

Studies on the life cycle of spirochetes. III. The life cycle of the Nichols pathogenic *Treponema pallidum* in the rabbit testis as seen by phase contrast microscopy. Edward D. DeLamater, Richter H. Wiggall, and Merle Haanes. J. Exper. Med., 92: 239–246, Sept. 1950.

Definite changes in organisms were observed to occur. Two means of vegetative reproduction occurred, consisting of transverse division and production of buds which eventuate into unispirochetal cysts, within each of which single spirochetes develop and differentiate.

Studies on the life cycle of spirochetes. IV. The life cycle of the Nichols pathogenic *Treponema pallidum* in the rabbit testis as visualized by means of stained smears. Edward D. DeLamater, Richter H. Wiggall, and Merle Haanes. J. Exper. Med., 92: 247–252, Sept. 1950.

Evidence presented confirms observations made by means of phase contrast microscopy and adds to accumulating evidence that a complex life cycle occurs in the pathogenic *Treponema pallidum* as well as in its saprophytic relatives.

### J. Indiana M. A., Indianapolis

Multiphasic screening. J. Indiana M. A., 43: 865–866, Sept. 1950.

Editorial warns that one disadvantage

J. INDIANA M. A., INDIANAPOLIS—Con.

of the multiphasic screening clinic is that it may, unless careful steps are taken to prevent it, give its patients a false sense of security.

## J. IOWA M. SOC., DES MOINES

State laboratory announces new serologic test for syphilis. J. Iowa M. Soc., 40: 459, Sept. 1950.

As of July 1, the State Hygienic Laboratory initiated the FPM method devised by the United States Public Health Service for the diagnosis of congenital syphilis in infants.

## J. LAB. & CLIN. MED., ST. LOUIS

Interpretation of findings in the cerebrospinal fluid. IV. Syndrome of normality. Carl Lange and John K. Miller. J. Lab. & Clin. Med., 36: 399–406, Sept. 1950.

The syndrome of normality consists of the values obtained with five tests. The results of 500 normal cerebrospinal fluids tested are: appearance, clear and colorless; complement-fixation tests, no reaction; total cell count, 0/3 to 3/3 cells per cubic millimeter; total protein by turbidimetric methods, 16 to 30 mg. per 100 milliliters; and quantitative colloidal gold reaction, type A curve.

## J. MAINE M. A., PORTLAND

Causes of blindness in Maine. Dexter J. Clough, 2nd. J. Maine M. A., 41: 262–267, July 1950.

A report is presented of the causes of blindness in a series of 292 cases comprising the applicants for aid to the blind in Maine during the years 1946 through 1949. Ophthalmia neonatorum and syphilis as causes of blindness have decreased considerably in the past 35 years.

## J. NAT. M. A., NEW YORK

The United States Public Health Mission in Liberia. Hildrus A. Poindexter. J. Nat. M. A., 42: 275–278, Sept. 1950.

A report on the progress of the mission is presented. Treponemiasis in the coastal area is predominantly syphilis, while in the hinterland, it is yaws. Between 25 and 33 percent of the population give clinical or serologic evidences infection with treponemes. A correlati has been observed between the decrea in yaws and increase in the use of DD

Nonspecific urethritis in the male. Char H. Garvin. J. Nat. M. A., 42: 303–3 Sept. 1950.

Nonspecific urethritis is discussed as etiology, symptoms, diagnosis, and trea ment. No case of urethral dischar should be labeled gonococcic unle proved by stain or culture. Importan of *Trichomonas vaginalis* in producti of urethral discharge is emphasized.

## J. PHILIPPINE M. A., MANILA

Early syphilis in Manila. Antonio A. zano. J. Philippine M. A., 26: 213–2 May 1950.

This study, based on 325 patients wi darkfield-positive lesions of primary a secondary syphilis seen at the Mani Rapid Treatment Center from the mid part of 1947 to 1949, presents some of t epidemiologic features of early syphi as they occur among Filipinos in Mani

## J. TENNESSEE M. A., NASHVILLE

The present-day treatment of syphil Editorial. J. Tennessee M. A., 63: 2 294, Aug. 1950.

A review of suggested treatme schedules for syphilis as supplied to t physicians of Tennessee is present Adequate follow-up of the patient is e phasized.

## LANCET, LONDON

Chemotherapy of venereal diseases: uses and abuses. Dermatology. Sci tific Sections. Lancet, 2: 265, Aug. 1950.

Therapeutic efficacy of penicillin, str tomycin, and sulfonamides in treatme and control of venereal diseases is d cussed.

## M. ANN. DISTRICT OF COLUMBIA, WAS INGTON

Chronic arthritis in Reiter's syndro Report of two cases. Maurice H. He

### . ANN. DISTRICT OF COLUMBIA, WASHINGTON—Continued

mark. M. Ann. District of Columbia, 19: 428–430, 472, Aug. 1950.

Late manifestations of Reiter's synrome are discussed with special refernce to joint involvement. Late changes re similar to those of Neisserian infecon. Differential diagnosis from gout, heumatoid arthritis, and gonorrheal arhritis was considered.

Treatment of venereal diseases. Sidney Olansky and Gerda S. Landman. M. Ann. District of Columbia, 19: 491–494, Sept. 1950.

Penicillin treatment of syphilis is comared with that of arsenic and bismuth. reatment with aureomycin, Chloromyetin, and terramycin is also discussed. ther venereal diseases are discussed riefly.

### I. J. AUSTRALIA, SYDNEY

Some practical aspects of venereal disease. N. D. G. Abbott. M. J. Australia, 2: 224–227, Aug. 5, 1950.

Diagnosis and treatment of syphilis nd gonococcic and nongonococcic urehritis in the male are discussed from the oint of view of the general practitioner.

### I. OFFICER, LONDON

Blindness. M. Officer, 84: 70–71, Aug. 12, 1950.

Article is a review of a report by Arold Sorsby on causes of blindness in Engand and Wales. Rates are given showng percent of blindness from various auses. Blindness from ophthalmia eonatorum is almost extinct. Blindness rom syphilis has possibility of being bolished.

### IL. SURGEON, WASHINGTON

Preventive medicine in Austria; a postwar report. Philip R. Beckjord. Mil. Surgeon, 107: 190–198, Sept. 1950.

A review of developments in certain spects of postwar health in occupied ustria is given. Venereal diseases preented a serious problem. In June 1946 he Army launched a penicillin program or treatment of gonorrhea. By 1948 the yphilis-gonorrhea ratio was 1:1.59 for ll Austria.

### NEW YORK STATE J. MED., NEW YORK

Experimental multiphasic screening unit. Editorial. New York State J. Med., 50: 2017–2018, Sept. 1, 1950 (Part I).

Program of the Chronic Disease Research Institute, Buffalo, N. Y., organized to determine the practicability and reliability of multiphasic screening examinations, is outlined.

### NORTH CAROLINA M. J., WINSTON-SALEM

Treatment of discharges from the vagina in private practice. G. G. Passmore, North Carolina M. J., 11: 487–490, Sept. 1950.

*Trichomonas vaginalis* is included in this general discussion of causes, treatment, and types of vaginal discharges.

### OKLAHOMA HEALTH BULL., OKLAHOMA CITY

Laboratory runs 8,000 blood tests for 45th. Oklahoma Health Bull., 8: 35, Sept. 1950.

Central laboratory of the Oklahoma State Department of Health ran 8,000 blood tests of members of the 45th Infantry Division in addition to 150 tests run each day for all Army induction centers in the State.

Mass screening may lead the way to new tests for old diseases. A. L. Chapman. Oklahoma Health Bull., 8: 35–36, Sept. 1950.

Evolution and possible applications of multiphasic screening tests in the detection of diseases are discussed.

### PENNSYLVANIA M. J., HARRISBURG

Commission on the control of syphilis and venereal diseases. Official Transactions. Pennsylvania M. J., 53: 887, Aug. 1950.

Annual report stresses the need to define accurately the venereal disease problem in private medical practice throughout the State. The definition is reasonably accurate for public and private clinic facilities, but the many ramifications of case finding and case holding which affect private medical practice are less accurately studied and are essential to a knowledge of the over-all program.

Syphilitic aortitis. Diagnosis by means of ascending aortic calcification. James Jackman. Pennsylvania M. J., 53: 972–973, Sept. 1950.

Study of 20 patients showing calcifica-

### Pennsylvania M. J., Harrisburg—Con.

tion in routine chest X-ray examinations and review of 200 films drawn from the files for control purposes lead author to conclude that X-ray demonstration of calcification of the ascending aorta is a reliable diagnostic sign of syphilitic aortitis.

### Philadelphia Health Bull., Philadelphia

Division of venereal disease control. Norman R. Ingraham, Jr. Philadelphia Health Bull., p. 7, July 1950.

Gonorrhea morbidity topped all reportable diseases in Philadelphia during 1949. Upward trend indicated recognition and control. Syphilis was fourth, with the downward trend of the previous year continuing.

### Post-Grad. M. J., London

Aureomycin. John Crofton. Post-Grad. M. J., 26 : 368–371, July 1950.

The pharmacology, dosage, toxicity, bacteriology, drug-resistance, and clinical uses of this antibiotic are reviewed.

### Postgrad. Med., Minneapolis

Practical applications of bacteriologic studies in the diagnosis of infectious diseases. Samuel Saslaw. Postgrad. Med., 8 : 184–190, Sept. 1950.

Bacteriologic procedures (smears and cultures) and serologic procedures used in diagnosing various infections, including venereal diseases, are described. Cooperation between the clinician and the bacteriologist is stressed.

Management of prostatitis. Russell D. Herrold. General Practice Review. Postgrad. Med., 8 : 237–239, Sept. 1950.

The management of nonspecific uncomplicated prostatitis, epididymitis, gonococcic prostatitis, and abacterial pyuria is considered, together with a discussion of the clinical and laboratory appraisal of infections and tests of sensitivity to the various antibiotics.

### Practitioner, London

Favourite prescriptions in diseases of the nervous system. E. Bellingham Smith. Practitioner, 165 : 22–32, July 1950.

This article is confined to the treatme of diseases of the nervous system, inclu ing tabes dorsalis, by the use of dru and prescriptions which in some instanc may be curative and in others give pure symptomatic relief.

Favourite prescriptions in ophthalmolog A. McKie Reid. Practitioner, 165 : 5 58, July 1950.

Prescriptions are presented for vario infections of the eye, including oph thalmia neonatorum.

### Proc. Soc. Exper. Biol. & Med., Utica

Survival of *Trichomonas vaginalis* in va inal discharge. John F. Kessel and C stance F. Thompson. Proc. Soc. Exp Biol. & Med., 74 : 755–758, Aug. 1950.

Survival of *Trichomonas vaginalis* w determined by studying discharges fr 50 untreated patients with vaginal tric moniasis. Data obtained in this stu together with experimental and epide ologic reports of other workers, indica that fomites contaminated with *T. va nalis* may, under natural conditions, as agents in the transmission of vagi trichomoniasis.

### Pub. Health Rep., Washington

Specific causes of illness found in mont canvasses of families. Sample of Eastern Health District of Baltim 1938–43. Selwyn D. Collins, F. R Phillips, and Dorothy S. Oliver. P Health Rep., 65 : 1235–1264, Sept. 1950.

Statistics on syphilis are included this report on a 5-year study of illn among a sample population.

### South. M. J., Birmingham

The treatment of acute and chronic uve Bennett Y. Alvis. South. M. J., 727–731, Aug. 1950.

Evaluation of treatment for vari types of uveitis is given. Gonorrheal c ditions usually yield to use of penicil and sulfadiazine augmented by fe therapy, if the condition is severe. Sy ilitic ocular disease does not respond w the same high degree of success.

### SOUTH. SURGEON, ATLANTA

Streptomycin in the treatment of granuloma inguinale of the cervix uteri and vulva. Randolph H. Hoge and Arnold M. Salzberg. South. Surgeon, 16: 746–753, Aug. 1950.

Streptomycin has been employed in three patients with granuloma inguinale of the cervix uteri and five patients with granuloma inguinale of the vulva. Seven of the eight patients were cured of the nfection; in the eighth and most recent case, the cervix was healing satisfactorily when last seen.

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### STATIST. BULL. METROP. LIFE INSUR. CO., NEW YORK

Revolutionary advances in the control of infections. Statist. Bull. Metrop. Life Insur. Co., 31: 4–7, Sept. 1950.

This general discussion on development and use of antibiotics in control and treatment of diseases mentions the gains made against venereal diseases through the use of penicillin.

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### U. S. ARMED FORCES M. J., WASHINGTON

The clinical use of antibiotics. II. Prophylaxis of infections. Perrin H. Long. U. S. Armed Forces M. J., 1: 1001–1005, Sept. 1950.

Effectiveness of antibiotics in treatment and control of various diseases and infections is discussed. Intramuscular administration of 300,000 units of procaine penicillin G in aqueous suspension is considered effective in preventing gonococcic infection. Crystalline penicillin G in doses of 5,000 units given intramuscularly at intervals of 3 hours or an ointment containing 100,000 units will bring about a cure of ophthalmia neonatorum within 2 or 3 days.

Antibiotic drugs in venereal disease therapy. Michael J. Scott. U. S. Armed Forces M. J., 1: 1017–1020, Sept. 1950.

A review of the literature is given. Importance and desirability of having an alternative antibiotic drug for the sensitized patient is discussed.

Circumcision in the adult. Judson A. Millspaugh. U. S. Armed Forces M. J., 1: 1035–1037, Sept. 1950.

During the past 3 years more than 350 circumcisions were performed at the United States Naval Hospital, Pensacola, Fla. Since over 150 circumcisions of patients with early syphilis have healed primarily, it is concluded that early syphilis under treatment with penicillin is no contraindication to simple elective operation and that circumcision serves to increase resistance to reinfection and malignancy.

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### UROL. & CUTAN. REV., WEST PALM BEACH

Ambulatory intensive treatment of syphilis with penicillin in oil and wax. Final report. Richard A. Koch. Urol. & Cutan. Rev., 54: 534–546, Sept. 1950.

A final report is presented on the observation of early syphilis patients who were placed on intensive ambulatory therapy, previous reports having been published in 1946 and 1947. Results indicate that all patients treated in this manner should be observed for a minimum period of 24 months, in view of the fact that treatment failures occur as late as between 21 to 24 months following treatment.

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### VIRGINIA M. MONTHLY, RICHMOND

Obstetrical factors in infant mortality. Eugene S. Groseclose. Virginia M. Monthly, 77: 451–454, Sept. 1950.

Syphilis is discussed as one factor of vital importance. Routine Wassermann test is recommended for every expectant mother.

Venereal disease control. (Dudley C. Smith, Chairman.) Reports for the 1950 Annual Meeting Medical Society of Virginia. Virginia M. Monthly, 77: 491–492, Sept. 1950.

A review of the control work accomplished in the past year is given. This included the enactment of a prenatal law, distribution of penicillin to physicians, and a meeting held for the purpose of educating individuals interested in venereal disease control.

# STATISTICS

## Reported Venereal Disease Cases and Rates per 100,000 Population, Continental United States Civilians, Fiscal Year 1950

[Known military cases excluded]

| Disease and stage | Number of cases reported | | | | | | | | | Rate per 100,000 population | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | All races | | | White | | | Nonwhite | | | All races | | | White | | | Nonwhite | | |
| | Total | Male | Female | Total | Male | Female | Total | Male | Female | Total | Male | Female | Total | Male | Female | Total | Male | Female |
| REPORTED BY ALL SOURCES | | | | | | | | | | | | | | | | | | |
| Total syphilis | 231, 567 | 112, 090 | 119, 477 | 83, 823 | 45, 667 | 38, 156 | 147, 744 | 66, 423 | 81, 321 | 155. 1 | 152. 4 | 157. 8 | 62. 9 | 69. 4 | 56. 5 | 926. 1 | 855. 2 | 993. 4 |
| Primary or secondary | 32, 250 | 17, 736 | 14, 514 | 12, 560 | 7, 722 | 4, 838 | 19, 690 | 10, 014 | 9, 676 | 21. 6 | 24. 1 | 19. 2 | 9. 4 | 11. 7 | 7. 2 | 123. 4 | 128. 9 | 118. 2 |
| Early latent | 65, 567 | 25, 529 | 40, 038 | 17, 648 | 7, 728 | 9, 920 | 47, 919 | 17, 801 | 30, 118 | 43. 9 | 34. 7 | 52. 9 | 13. 2 | 11. 7 | 14. 7 | 300. 4 | 229. 2 | 367. 9 |
| Late and late latent | 113, 174 | 58, 863 | 54, 311 | 46, 083 | 26, 432 | 19, 651 | 67, 091 | 32, 431 | 34, 660 | 75. 8 | 80. 0 | 71. 7 | 34. 6 | 40. 2 | 29. 1 | 420. 6 | 417. 5 | 423. 4 |
| Congenital | 13, 646 | 5, 982 | 7, 664 | 4, 139 | 1, 613 | 2, 526 | 9, 507 | 4, 369 | 5, 138 | 9. 1 | 8. 1 | 10. 1 | 3. 1 | 2. 5 | 3. 7 | 59. 6 | 56. 2 | 62. 8 |
| Stage not reported | 6, 930 | 3, 980 | 2, 950 | 3, 393 | 2, 172 | 1, 221 | 3, 537 | 1, 808 | 1, 729 | 4. 6 | 5. 4 | 3. 9 | 2. 5 | 3. 3 | 1. 8 | 22. 2 | 23. 3 | 21. 1 |
| Gonorrhea | 304, 066 | 214, 973 | 89, 093 | 78, 819 | 51, 867 | 26, 952 | 225, 247 | 163, 106 | 62, 141 | 203. 7 | 292. 3 | 117. 7 | 59. 1 | 78. 8 | 39. 9 | 1, 411. 9 | 2, 100. 0 | 759. 1 |
| Chancroid | 5, 825 | 4, 794 | 1, 031 | 1, 290 | 1, 137 | 153 | 4, 535 | 3, 657 | 878 | 3. 9 | 6. 5 | 1. 4 | 1. 0 | 1. 7 | 0. 2 | 28. 4 | 47. 1 | 10. 7 |
| Granuloma inguinale | 2, 017 | 1, 190 | 827 | 81 | 63 | 18 | 1, 936 | 1, 127 | 809 | 1. 4 | 1. 6 | 1. 1 | 0. 1 | 0. 1 | 0. 0 | 12. 1 | 14. 5 | 9. 9 |
| Lymphogranuloma venereum | 1, 636 | 1, 230 | 406 | 134 | 119 | 15 | 1, 502 | 1, 111 | 391 | 1. 1 | 1. 7 | 0. 5 | 0. 1 | 0. 2 | 0. 0 | 9. 4 | 14. 3 | 4. 8 |
| REPORTED BY PRIVATE PHYSICIANS | | | | | | | | | | | | | | | | | | |
| Total syphilis | 80, 842 | 38, 928 | 41, 914 | 44, 942 | 23, 617 | 21, 325 | 35, 900 | 15, 311 | 20, 589 | 54. 2 | 52. 9 | 55. 4 | 33. 7 | 35. 9 | 31. 6 | 225. 0 | 197. 1 | 251. 5 |
| Primary or secondary | 10, 450 | 5, 625 | 4, 825 | 6, 063 | 3, 584 | 2, 479 | 4, 387 | 2, 041 | 2, 346 | 7. 0 | 7. 6 | 6. 4 | 4. 5 | 5. 4 | 3. 7 | 27. 5 | 26. 3 | 28. 7 |
| Early latent | 20, 134 | 7, 946 | 12, 188 | 8, 656 | 3, 729 | 4, 927 | 11, 478 | 4, 217 | 7, 261 | 13. 5 | 10. 8 | 16. 1 | 6. 5 | 5. 7 | 7. 3 | 71. 9 | 54. 3 | 88. 7 |
| Late and late latent | 42, 596 | 21, 524 | 21, 072 | 25, 574 | 13, 890 | 11, 684 | 17, 022 | 7, 634 | 9, 388 | 28. 5 | 29. 3 | 27. 8 | 19. 2 | 21. 1 | 17. 3 | 106. 7 | 98. 3 | 114. 7 |
| Congenital | 2, 692 | 956 | 1, 736 | 1, 976 | 676 | 1, 300 | 716 | 280 | 436 | 1. 8 | 1. 3 | 2. 3 | 1. 5 | 1. 0 | 1. 9 | 4. 5 | 3. 6 | 5. 3 |
| Stage not reported | 4, 970 | 2, 877 | 2, 093 | 2, 673 | 1, 738 | 935 | 2, 297 | 1, 139 | 1, 158 | 3. 3 | 3. 9 | 2. 8 | 2. 0 | 2. 6 | 1. 4 | 14. 4 | 14. 7 | 14. 1 |
| Gonorrhea | 43, 103 | 32, 774 | 10, 329 | 24, 417 | 18, 866 | 5, 551 | 18, 686 | 13, 908 | 4, 778 | 28. 9 | 44. 6 | 13. 6 | 18. 3 | 28. 7 | 8. 2 | 117. 1 | 179. 1 | 58. 4 |
| Chancroid | 200 | 167 | 33 | 115 | 103 | 12 | 85 | 64 | 21 | 0. 1 | 0. 2 | 0. 0 | 0. 1 | 0. 2 | 0. 0 | 0. 5 | 0. 8 | 0. 3 |
| Granuloma inguinale | 53 | 26 | 27 | 13 | 8 | 5 | 40 | 18 | 22 | 0. 0 | 0. 0 | 0. 0 | 0. 0 | 0. 0 | 0. 0 | 0. 2 | 0. 2 | 0. 3 |
| Lymphogranuloma venereum | 61 | 41 | 20 | 15 | 12 | 3 | 46 | 29 | 17 | 0. 0 | 0. 1 | 0. 0 | 0. 0 | 0. 0 | 0. 0 | 0. 3 | 0. 4 | 0. 2 |

REPORTED BY CLINICS, HOSPITALS, OR OTHER INSTITUTIONS

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total syphilis | 150, 725 | 73, 162 | 77, 563 | 38, 881 | 22, 050 | 16, 831 | 111, 844 | 51, 112 | 60, 732 | 101. 0 | 99. 5 | 102. 4 | 29. 2 | 33. 5 | 24. 9 | 701. 1 | 658. 1 | 741. 9 |
| Primary or secondary | 21, 800 | 12, 111 | 9, 689 | 6, 497 | 4, 138 | 2, 359 | 15, 303 | 7, 973 | 7, 330 | 14. 6 | 16. 5 | 12. 8 | 4. 9 | 6. 3 | 3. 5 | 95. 9 | 102. 7 | 89. 5 |
| Early latent | 45, 433 | 17, 583 | 27, 850 | 8, 992 | 3, 999 | 4, 993 | 36, 441 | 13, 584 | 22, 857 | 30. 4 | 23. 9 | 36. 8 | 6. 7 | 6. 1 | 7. 4 | 228. 4 | 174. 9 | 279. 2 |
| Late and late latent | 70, 578 | 37, 339 | 33, 239 | 20, 509 | 12, 542 | 7, 967 | 50, 069 | 24, 797 | 25, 272 | 47. 3 | 50. 8 | 43. 9 | 15. 4 | 19. 1 | 11. 8 | 313. 9 | 319. 3 | 308. 7 |
| Congenital | 10, 954 | 5, 026 | 5, 928 | 2, 163 | 937 | 1, 226 | 8, 791 | 4, 089 | 4, 702 | 7. 3 | 6. 8 | 7. 8 | 1. 6 | 1. 4 | 1. 8 | 55. 1 | 52. 6 | 57. 4 |
| Stage not reported | 1, 960 | 1, 103 | 857 | 720 | 434 | 286 | 1, 240 | 669 | 571 | 1. 3 | 1. 5 | 1. 1 | 0. 5 | 0. 7 | 0. 4 | 7. 8 | 8. 6 | 7. 0 |
| Gonorrhea | 260, 963 | 182, 199 | 78, 764 | 54, 402 | 33, 001 | 21, 401 | 206, 561 | 149, 198 | 57, 363 | 174. 8 | 247. 7 | 104. 0 | 40. 8 | 50. 2 | 31. 7 | 1, 294. 8 | 1, 920. 9 | 700. 7 |
| Chancroid | 5, 625 | 4, 627 | 998 | 1, 175 | 1, 034 | 141 | 4, 450 | 3, 593 | 857 | 3. 8 | 6. 3 | 1. 3 | 0. 9 | 1. 6 | 0. 2 | 27. 9 | 46. 3 | 10. 5 |
| Granuloma inguinale | 1, 964 | 1, 164 | 800 | 68 | 55 | 13 | 1, 896 | 1, 109 | 787 | 1. 3 | 1. 6 | 1. 1 | 0. 1 | 0. 1 | 0. 0 | 11. 9 | 14. 3 | 9. 6 |
| Lymphogranuloma venereum | 1, 575 | 1, 189 | 386 | 119 | 107 | 12 | 1, 456 | 1, 082 | 374 | 1. 1 | 1. 6 | 0. 5 | 0. 1 | 0. 2 | 0. 0 | 9. 1 | 13. 9 | 4. 6 |

Source: Reported cases from PHS Form 8958-B. Estimates of civilian population for January 1, 1950, by color and sex. Bureau of Census, unpublished data.
FSA-PHS—Division of Venereal Disease Office of Statistics, 11/15/50 (ML-EJMcC)mw.

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# The JOURNAL of VENEREAL DISEASE INFORMATION

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# Editorial

## Serologic Laboratory Evaluation

The summary results of the 1950 Evaluation of State Serologic Lab-ratories carried on pages 50–55, of this issue reflect creditably the high andard of performance that has been reached by the State laboratories the performance of the various serologic tests for syphilis.

The results are gratifying because they indicate the universal willing-ess of the 48 States and the District of Columbia to adopt the new tests they are developed and to strive for improved performance.

We are encouraged by the way all of the States are now taking part in e surveys of their laboratories, especially when we recall the first survey onsored by the Division of Venereal Disease in 1937 with only 39 States articipating. Since the beginning of these yearly evaluations, we have oted improvement in the ability of the individual laboratories to perform e tests and to approach the results obtained by the authors' laboratories. e are also gratified to observe that some States are taking the initiative review the performance of the serologic laboratories within their ju-isdiction—a practice that we should certainly like to see adopted by other tates.

These accomplishments are a tribute to the alertness of the laboratory irectors to the need for constant improvement of their serologic testing perations and to the technical skill of their personnel in performing the sts.

The wholehearted manner in which State laboratory directors have operated in these surveys substantially confirms our belief in the value nd importance of this evaluation activity. The services or advice of the ivision of Venereal Disease and its laboratory at Chamblee, Ga., are adily available to all for the continuation of this work.

THEODORE J. BAUER, *Medical Director,*
*Chief, Division of Venereal Disease.*

# Syphilis Among The Navaho Indians[1]

**Charles S. McCammon, Frank J. Dufner,[2] and Francis W. Felsman[3]**

One of the major health problems in the United States today is the medical care of the Navaho Indians, the largest and fastest growing, as well as one of the most primitive tribes in this country. Two and one-half years ago a new program to improve the standards of medical care for this people was initiated. The hospital program (*1*) has been successfully reorganized along modern medical lines. The public health program, although it has made many strides, has far to go to reach the proposed goal. It must be pointed out that this program had to be initiated without the benefit of facilities, equipment, or personnel.

The lay press and, in some instances, the professional press for many years have been furnished clinical impressions of various medical observers on the health conditions of the Navahos. However, at the beginning of this program there was no statistical evidence to substantiate these impressions. To better evaluate the health problems, a statistical section was organized which immediately collected and tabulated mortality figures from accumulated death certificates. At the same time studies of special health problems were initiated (*2, 3*).

The purpose of this report is to bring together the facts available in an attempt to evaluate the syphilis problem and to propose a plan for controlling this disease. Funds and personnel were not available for mass blood-testing surveys so that, with the exception of a large group of school-age children, the study has been carried out by using hospital records of the five Navaho Agency hospitals and the laboratory records of the Navaho Medical Center at Fort Defiance, Ariz. While it is recognized that this
plan will not give statistically sound fact
it will nevertheless give some workin
knowledge of the existing syphili
problem.

The physical difficulties that a healt
unit must face are tremendous. Th
Navaho reservation is approximately th
size of the State of West Virginia, bu
there are no paved roads; in fact, ther
are very few all-weather roads. Th
Navahos live a seminomadic life, livin
in family groups rather than in village
The winters are cold and severe, whil
the summers are dry and hot.

Of great significance also are the fact
that only about 15 percent of the Navaho
speak English and that most of them hav
had practically no education in health
sanitation. The only encouraging fact i
a venereal disease control program is th
intensive venereal disease education r
ceived by the young men who served i
the Armed Forces.

The attempt to evaluate the syphil
problem without funds for a mass bloo
testing program has been discouragin
and frequently unsatisfactory.

One approach used in the study was
accumulate data from hospital admi
sions for the years 1944 through 194
The Bureau of Indian Affairs has its ow
hospital record manual of "Nomenclatu
of Diseases and Conditions." The co
ing titles for syphilis, which are bo
inadequate and confusing, are listed
follows: Early (primary) syphilis; la
vascular syphilis; tabes dorsalis; ge
eral paresis; other forms of late syphil
of the central nervous system; oth
forms of late syphilis; congenital syp
ilis; syphilis, serology positive (on
finding); other forms of syphilis. To t
to classify a case of syphilis by this co
causes only confusion; to try to accum
late cases by stages of syphilis from su
records for a study such as this is i
possible. For example, one finds cas
reported for the age group 1 to 4 yea

---

[1] From the Health Division, Navaho Indian Agency, Window Rock, Ariz.

[2] Medical Officer in Charge, New Mexico Intensive Treatment Center, Albuquerque, N. Mex.

[3] Statistician.

coded under early syphilis; congenital syphilis; and syphilis, serology positive (only finding).

Because of this difficulty, it was felt necessary to disregard all classification and to compare the total admissions of syphilis patients of all ages with the total hospital admissions and with the estimated population for the years 1944 through 1949 (fig. 1). This approach revealed a variation of 25.4 to 42.6 cases of syphilis per 1,000 hospital admissions, the prevalence per 1,000 population being roughly one-tenth the incidence of hospital admissions. The only importance of this chart is to show the drop in hospital admissions for syphilis beginning in 1946, when more patients were probably being referred to the Intensive Treatment Center, and at which time the quality of hospital work was low because of the shortage of physicians.

These figures do not include the out-patient departments of the five Navaho service hospitals. Most of the out-patients with syphilis from the three eastern hospitals were referred to the Albuquerque Intensive Treatment Center for antisyphilitic treatment. During the years 1947 and 1949, the two western hospitals have been treating many of their syphilitic patients as out-patients by one of the rapid treatment schedules.

Statistically of more significance, although in a limited age group, are the 3,618 children receiving blood tests prior to being sent off the reservation to school. The results of this mass blood testing are seen in table 1. Serologic (Kahn) examinations were performed in the laboratory of the New Mexico Department of Public Health. These children represent the age group 5 years to approximately 20 years. Of 3,586 satisfactory examinations there were only 23 positive serologic specimens (a prevalence of 6.4 per thousand). Doubtful reactions are listed under unsatisfactory reports.

The laboratory records for the Navaho Medical Center from July 1, 1949, to June

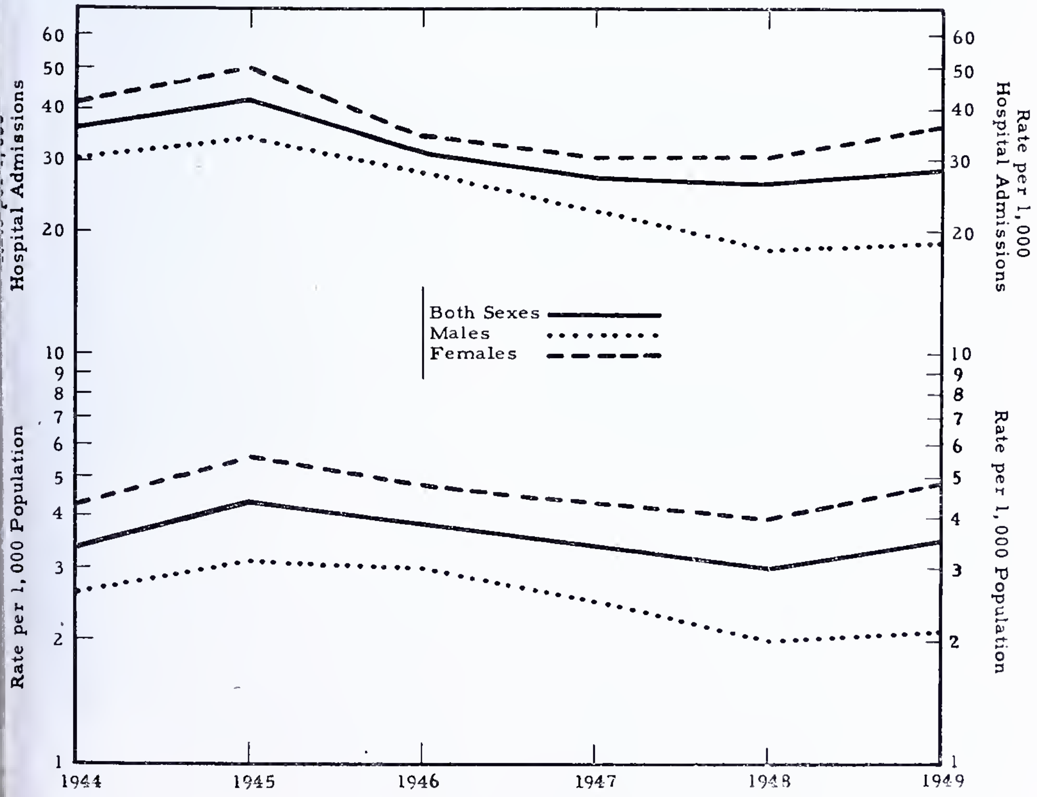

FIGURE 1.—Syphilis rates among Navaho Indians, total admissions, all ages, 1944–49.

30, 1950, show that 2,562 serologic examinations were made on 1,916 individuals. Of the 1,916 persons tested, 228 were found to have positive Kahn and/or Mazzini serologic reactions, a prevalence of 119.0 per thousand (11.9 percent) specimens examined. This does not give a satisfactory picture because it was impossible to separate all white persons who received Kahn tests as part of Civil Service physical examinations, although known white cases were deleted. It must be considered also that these reports were almost entirely on hospital patients (either in-patients or out-patients), many of whom were the contacts of known syphilitic patients who were brought to the hospital for examination, which would tend to make the prevalence higher than it actually is.

This study brought out also that not all patients admitted to the hospital were receiving routine serologic examinations as had been recommended in the reorganization of the hospital, which was completed in the fall of 1948.

It is felt that a truer prevalence of syphilis for the age group 16 to 45 years is probably demonstrated by 509 women admitted to the obstetrical service duri
the period July 1, 1949, to June 30, 19
In this group, 40 were found to have syp
ilis, treated or untreated, a prevalence
78.6 per thousand (7.86 percent). The
figures have not varied more than 0.5 p
cent during the past year.

It is recognized that this latter group
not only statistically small, but that it
also a limited age group of one sex. Ho
ever, it must be pointed out that this a
group is probably the most active a
group sexually and that previous vener
disease studies have not shown a sign
cant difference in the prevalence of syp
ilis by sex.

The mortality statistics for the numb
of deaths from syphilis for the years 1
to 1948 are shown in table 2.

From this limited material it is
that the prevalence of syphilis for the
group 20 and over is between 70 per th
sand (7 percent) and 100 per thousa
(10 percent). For the total Navaho p
ulation, it is probably less than 55
thousand (5.5 percent). Of an estima
67,300 population, 23,997 are of school a
with approximately 9,230 of presch
age.

**Table 1.—*Syphilis serology reports of school children sent to school off the reservation (Arizona and New Mexico)*[1]**

| Sex | Age group (years) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 5-9 | | | | 10-14 | | | | 15–19 | | | | 20 and over | | | |
| | Serologic result | | | | | | | | | | | | | | | |
| | Negative | Positive | Unsatisfactory | Total | Negative | Positive | Unsatisfactory | Total | Negative | Positive | Unsatisfactory | Total | Negative | Positive | Unsatisfactory | Total |
| | 1948 | | | | | | | | | | | | | | | |
| Male | 3 | ---- | ---- | 3 | 416 | 1 | 5 | 422 | 453 | 4 | 4 | 461 | 9 | ---- | ---- | 9 |
| Female | 1 | ---- | ---- | 1 | 270 | 3 | 2 | 275 | 349 | 4 | 3 | 356 | 5 | ---- | ---- | 5 |
| Total | 4 | ---- | ---- | 4 | 686 | 4 | 7 | 697 | 802 | 8 | 7 | 817 | 14 | ---- | ---- | 14 |
| | 1949 | | | | | | | | | | | | | | | |
| Male | 2 | ---- | ---- | 2 | 556 | 1 | 1 | 558 | 620 | 4 | 5 | 629 | 15 | ---- | ---- | 15 |
| Female | 1 | ---- | ---- | 1 | 393 | ---- | 3 | 396 | 462 | 6 | 9 | 477 | 8 | ---- | ---- | 8 |
| Total | 3 | ---- | ---- | 3 | 949 | 1 | 4 | 954 | 1,082 | 10 | 14 | 1,106 | 23 | ---- | ---- | 23 |

[1] Serology tests taken at Fort Wingate, N. Mex., and Tuba City, Ariz.

**Table 2.—*Syphilis mortality rates among Navaho Indians, 1944–48***

| Year | Number of deaths | | Death rate | | | |
|---|---|---|---|---|---|---|
| | | | Crude (per 100,000) | | Live births (per 1,000) | |
| | Total | Infant | Navaho | United States | Navaho | United States |
| 14 | 9 | 7 | 14.8 | 11.3 | 5.6 | 0.3 |
| 15 | 12 | 11 | 19.6 | 10.7 | 9.4 | .3 |
| 16 | 9 | 9 | 14.4 | 9.3 | 6.4 | .2 |
| 17 | 9 | 8 | 14.1 | 8.8 | 5.6 | .2 |
| 18 | 15 | 13 | 22.8 | 8.0 | 10.1 | .1 |

## Discussion

Although there is no desire to enter
e debate for or against the theory of
e pre-Columbian origin of syphilis, it
felt that an explanation of the Navaho
rm for syphilis would be of interest.
ha'ch'osh, the Navaho word for syphilis,
a pure word and is not a descriptive
ord or a translated phrase as are most
avaho words for diseases. This would
dicate that the Navahos recognized this
sease before they were introduced to
e white man's medicine.

As there has been much discussion,
ith conflicting reports, on the preva-
nce of syphilis among Indians, it is
lt that a review of some of the litera-
re for this group is warranted. Lyn-
alter (*4*) in 1923 reported a prevalence
31 percent positive serologic findings
r syphilis among the Pueblo Indians.
ant (*5*) found 10.9 percent of the men
d 7.5 percent of the women among the
dians of South Dakota to have sero-
gic evidence of syphilis. Among the
dians of New Mexico, Clarke (*6*) re-
rted a serologic case rate of 1.5 per
ndred for males and 2.3 for females,
hile Dunham (7) reported a prevalence
2 percent positive serology among 219
eblo children.

In June 1949, Findley (*8*) studied 90
avasupai Indians living in isolated
pai Canyon of northern Arizona. He
und 18 individuals with definitely posi-
ve serology; 5 others showed doubtful
line and Kahn tests, giving a finding of
.5 percent positive reactors. It seems
likely that the source of infection was
om outside contacts.

Breazeale (*9*), after his many laboratory studies of the serologic reaction of several Indian tribes, has come to the conclusion that there is some factor inherent in the Southwestern Indian that predisposes to unreliable serologic testing with precipitation-flocculation tests. There appears to be no evidence to indicate that seasonal variation, environmental conditions, nutritional habits, or tribal variations have any significant effect on the unsatisfactory serologic findings. He found that the over-all percent positive serologic findings on a group of Pima, Papago, Navaho, and Hopi Indians were 26.4 percent. He reports a 5-percent variation in all repeat samples.

Of even greater interest is the work being done at the present time by Breazeale (*9*). By modifying standard serologic technic, he is performing serologic studies on skeletal remains of Arizona Indians, the ages of which are estimated to be from 1,000 years to about 10,000 years. Serologic reactors are being obtained in 10 to 12 percent of the specimens examined.

In an extensive mass survey conducted in April 1949 by the United States Public Health Service and the Bureau of Indian Affairs (*10*) among the San Carlos Apache Indians of Arizona, 3,003 of an estimated 3,100 Indians enrolled were examined for the purpose of determining the percentage of positive serologic tests for syphilis. The number of positive and doubtful reactions reported totaled 460, or 15.3 percent of the 3,003 Apaches examined. Serologic tests were performed in the Durham Laboratory (quantitative

**Table 3.—*Syphilis admissions to the New Mexico Intensive Treatment Cente (Albuquerque) from February 7, 1944, to December 31, 1949***

| Race | Primary and secondary syphilis | | Early latent syphilis | | Late latent syphilis | | Congenital syphilis | | Central nervous system syphilis | | Tota |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Percent | Number | Percent | Number | Percent | Number | Percent | Number | Percent | Number |
| White | 740 | 18 | 920 | 23 | 1,000 | 25 | 440 | 11 | 915 | 23 | 4,015 |
| Nonwhite [1] | 180 | 27 | 225 | 34 | 175 | 26 | 35 | 5 | 55 | 8 | 670 |
| Indian | 455 | 31 | 515 | 35 | 250 | 17 | 110 | 7 | 145 | 10 | 1,475 |
| Total | 1,375 | ------ | 1,660 | ------ | 1,425 | ------ | 585 | ------ | 1,115 | ------ | 6,160 |

[1] Includes approximately 8 to 10 admissions for the yellow and brown races.

Kahn) and in the Arizona State Laboratory (qualitative Kline, quantitative Kahn). Of the 460 positive reports, only 341 gave positive reactions in all three tests; of these, 53 gave reports of less than eight Kahn units or were positive in dilution of only 1:1. Actually the prevalence of syphilis in this group may be only 9.6 percent to 11 percent. It will be interesting, in the light of Breazeale's study, to see the follow-up reports on the 172 weakly positive specimens.

From the experience of one of the authors (Dufner) in the New Mexico Intensive Treatment Center, it was felt that at least 90 percent of the Indians reporting for voluntary treatment were found to have evidence of one of the venereal diseases. Only 63.6 percent of the Indians referred to the Center (February 7, 1944, through December 31, 1949) were referred by the United States Indian Service. The interviewer at this facility felt that the Indians realized venereal disease to be a definite health problem and that many of the more intelligent were trying to do something about the problem. Certainly the venereal disease education received by Indian veterans seems to have made more impression on the group than any other health education received in the Armed Forces.

A comparison of admissions to the New Mexico Intensive Treatment Center by color, with a breakdown by stages of infection, is shown in table 3.

It is not surprising to find a varying prevalence of syphilis among the many Indian tribes. The economic and
cational levels of the different tribes
as much as in the general populat
Some tribes, like the Navahos, live in
lated family groups; others, like
Pueblo people, live in crowded villa
There is a difference also in the attitu
of the various Indian Nations tow
promiscuity. A higher prevalence
syphilis would probably be found am
those Indians having more intimate
tact with non-Indian groups of low
come.

## Conclusion

A study is presented in which an
tempt is made to determine the pre
lence of syphilis among the Navaho
dians, by utilizing mass survey reco
and hospital and laboratory records.
is felt that the prevalence of syphilis
the Navaho population is probably
than 5 percent. When compared w
other major public health problems
the Navaho Reservation, such as inf
diarrhea, enteritis, tuberculosis, and
ternal and infant mortality, it is felt t
syphilis is only a secondary health pr
lem.

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# Results of Penicillin Therapy for Neurosyphilis at Bellevue Hospital[1]

Bernhard Dattner, M. D., Evan W. Thomas, M. D., and Lopo de Mello, M. D.

More than 6 years have passed since we egan to treat neurosyphilis at Bellevue Iospital with penicillin alone. During iese years we have treated well over 600 atients diagnosed as having had some orm of neurosyphilis, but only 555 were reated because of active neurosyphilis, s demonstrated by spinal fluid findings, e., pleocytosis in addition to other laboatory evidence of neurosyphilis. This eport is confined to the 555 active cases. 'atients with no evidence of an active ifection, as shown by spinal fluid findigs, are not included, since they were reated as a precautionary measure beause we thought previous therapy might ot have been adequate to prevent reipse or because we wished to observe the ffect of treatment on the clinical status f the patients. As none of the patients reated for inactive infections relapsed or howed any significant clinical improveient after penicillin therapy, there is no alue in including them in this report, xcept to note the fact that, in our expeience, significant clinical improvement cannot be effected by treating patients for neurosyphilis when the spinal fluid findings indicate no activity.

Of the 555 patients treated for active neurosyphilis, 117 failed to receive follow-up spinal fluid examinations by us more than 6 months after treatment. Many of these patients were never placed on a research basis in our service because they lived outside of New York City and did not plan to return to us for follow-up studies; a few were transferred to a State hospital following our treatment, and 15 are known to have died from miscellaneous causes without having had follow-up spinal fluid examinations by us. So far as we know none of the 15 deaths was directly attributable to neurosyphilis.

Although the patients who were admitted to a State hospital following penicillin therapy must be regarded as clinically unsatisfactory, none can be considered a treatment failure unless the spinal fluid findings failed to respond satisfactorily. A visit to any large State hospital for mental diseases will disclose many inmates who have been treated with malaria followed by injections of pentavalent arsenicals and bismuth for years without sufficient recovery to be discharged from the hospital. Very few of these hospitalized patients have active neurosyphilis, as demonstrated by spinal fluid findings, and many have attained completely normal spinal fluid findings within 10 years after fever therapy. Although they continue to be psychotic or disabled, they no longer have active neurosyphilis, and some of them, originally diagnosed as having general paresis, were probably psychotic for other reasons. The authors of this report have proved the truth of these statements by examining the inmates diagnosed as having had neurosyphilis at one of the large New York State hospitals. A review of the records of these patients indicates the futility of continued antisyphilitic treatment after the spinal fluid findings have become inactive and have remained inactive.

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Because clinical improvement cannot be expected when signs and symptoms are due to irreparable damage in the central nervous system, the evaluation of treatment in our series of patients is made entirely by spinal fluid examinations and, for our purposes, we have relied only on spinal fluid examinations made in our own service and in the New York State Department of Health laboratory. Discarding the 117 lost cases, we have 438 patients who had spinal fluid examinations at more or less regular intervals for periods of 6 to 75 months. Most of them had spinal fluid examinations every 3 or 4 months the first year after treatment and at 6-month intervals thereafter.

Table 1 gives the number of patients treated for various classifications of neurosyphilis and the amount of penicillin received by the 438 followed-
patients. During the first year of pe
cillin therapy, numerous patients recei
less than 6 million units of penicillin,
having had only 2 million units. Si
May 1945, almost all patients have
ceived at least 6 million units at th
original treatment. When aqueous so
tions of penicillin were used, the rout
treatment was 40,000 units every 3 ho
for 150 doses. When POB was used,
treatment consisted of from 10 to 15 da
injections of 600,000 units, and most
the patients treated with procaine pe
cillin in oil and aluminum monostear
received 15 daily injections of 600,0
units (total, 9 million units).

### Results of Treatment

Of the 438 patients with follow-up
servations, 363 received only a si
course of penicillin, and all had inac
spinal fluid findings when last exami
An additional 17 patients were re-trea
for clinical reasons at various interv
up to 3 years after their original tr
ment, in spite of the fact that their in
tions were completely arrested, as i
cated by the spinal fluid tests, at the t
of re-treatment. Most of them were
treated to note the effect on lightn
pains. In no case were lightning pa
permanently stopped by re-treatment.
is well known, lightning pains can of
times be temporarily relieved by p
cillin therapy when the patient has s
infection other than syphilis which
sponds to penicillin. Four patients w
optic atrophy were re-treated after t

**Table 1.**—***Summary of 438 patients classified according to type of neurosyph***
***and amount of penicillin received at original treatment***

| Diagnosis | Penicillin (million units) | | | | | | | To num pati trea |
|---|---|---|---|---|---|---|---|---|
| | 2.0 | 3.0 | 4.0 | 5.0 | 6.0 | 7.2 | 9.0 | |
| Asymptomatic neurosyphilis | 18 | 5 | 17 | 13 | 51 | 1 | 9 | |
| Meningovascular syphilis | 6 | 9 | 5 | 6 | 51 | 0 | 13 | |
| Tabes dorsalis | 4 | 20 | 7 | 7 | 38 | 0 | 6 | |
| General paresis | 1 | 1 | 21 | 9 | 25 | 2 | 8 | |
| Taboparesis | 0 | 1 | 12 | 3 | 13 | 0 | 2 | |
| Optic atrophy | 0 | 1 | 6 | 3 | 18 | 1 | 11 | |
| Erb's spastic paraplegia | 0 | 1 | 2 | 1 | 9 | 0 | 1 | |
| Total | 29 | 38 | 70 | 42 | 205 | 4 | 50 | |

**Table 2.—*Period of observations of follow-up on patients with satisfactory response to first treatment***

| Diagnosis | Total number of patients | Period (months) | | | | | |
|---|---|---|---|---|---|---|---|
| | | 6–12 | 13–24 | 25–36 | 37–48 | 49–60 | 61–75 |
| Asymptomatic neurosyphilis | 100 | 13 | 36 | 21 | 17 | 11 | 2 |
| Meningovascular syphilis | 79 | 13 | 20 | 15 | 17 | 10 | 4 |
| Tabes dorsalis | 79 | 4 | 20 | 21 | 12 | 14 | 8 |
| Dementia paralytica | 63 | 7 | 11 | 13 | 12 | 12 | 8 |
| Tabetic form of dementia paralytica | 30 | 2 | 3 | 6 | 5 | 9 | 5 |
| Optic atrophy with different clinical manifestations of neurosyphilis | 37 | 4 | 12 | 9 | 3 | 6 | 3 |
| Erb's spastic paraplegia | 12 | 2 | 0 | 5 | 2 | 3 | 0 |
| Total | [1] 400 | 45 | 102 | 90 | 68 | 65 | 30 |

[1] Of the 400 patients, 13 are known to have died with inactive spinal fluid findings, and their deaths were not attributable to neurosyphilis. Included in the 400 satisfactory cases are 17 patients who were re-treated after their spinal fluid findings had become inactive. They were re-treated for clinical reasons only, and in no case was re-treatment followed by significant clinical improvement.

spinal fluid findings had become inactive. Whether or not the optic atrophy was actually progressing in these cases when they were re-treated is difficult to say. All remained stationary following re-treatment with penicillin. In our opinion, the syphilitic infection of the central nervous system was arrested by the first course of penicillin in all 17 of these re-treated patients; therefore, they are included in the series with satisfactory response to the original treatment.

The 400 satisfactory cases following the first penicillin treatment are summarized in table 2, which shows that 255 have been observed for more than 2 years and 355, for more than 1 year. A follow-up of less than 1 year is not very significant because, in our experience, patients may relapse at any time during the first year after treatment. Relapses more than 1 year after treatment are relatively rare, in our experience, and we have not seen a single relapse of neurosyphilis, as demonstrated by spinal fluid findings, more than 2 years after treatment. By a relapse we mean a patient whose pleocytosis disappeared and the other spinal fluid findings improved following treatment only to develop high cell counts and a relapse of other spinal fluid findings at some later date. Other failures of treatment are those whose infection remains active at all times after treatment, as demonstrated by continued pleocytosis or the failure of other spinal fluid tests to show improvement. Both types of failures following treatment have been observed by us. The fact that 400 of the 438 followed-up patients (91 percent) responded satisfactorily to a single course of penicillin, the dosage having been less than 6 million units in 157 cases, is amazing proof of the effectiveness of penicillin in neurosyphilis.

## Failures Following Original Course of Treatment

Table 3 gives data on the 38 patients whose infections were at no time arrested by the original treatment or who relapsed after an initial period of inactivity. None of the relapses occurred more than 18 months after treatment.

Of the 38 failures following the first course of treatment, 22 received less than 6 million units of penicillin. As the majority of the patients in the entire series received at least 6 million units, it is clear that total doses of less than that amount are not advisable. In our judgment, the minimum dose of penicillin for any type of active neurosyphilis is at least 6 million units, and we now prefer 9 million units of procaine penicillin in oil and aluminum monostearate given over a period of at least 15 days. It is noteworthy that 14 of the 38 failures occurred in patients with asymptomatic neurosyphilis, and that 4 of the 14 were originally treated with 6 million units

**Table 3.—*Summary of 38 patients who failed to respond satisfactorily to first cour***
***of penicillin***[1]

| Diagnosis | Number of failures following 2,000,000–5,000,000 units of penicillin | Number of failures following 6,000,000 units of penicillin | Number failures fo lowing 9,00 000 units penicilli |
|---|---|---|---|
| Asymptomatic neurosyphilis | 8 | 4 | |
| Meningovascular syphilis | 5 | 6 | |
| Tabes dorsalis | 3 | 0 | |
| General paresis | 2 | 2 | |
| Taboparesis | 0 | 1 | |
| Optic atrophy | 2 | 0 | |
| Erb's spastic paraplegia | 2 | 0 | |
| Total | 22 | 13 | |

[1] Of the 38 patients, only 31 were re-treated by us; 3 were lost or re-treated elsewhere; 4 are still under
servation—3 because of continued questionable pleocytosis and 1 because of continued very high to
protein values.

**Table 4.—*Summary of 31 re-treated patients***

| Diagnosis | Number re-treated once only | Number re-treated twice only | Number re-treated three times | Number with satisfactory status when last examined | Numbe whose status still questio able |
|---|---|---|---|---|---|
| Asymptomatic neurosyphilis | 9 | 1 | 3 | 10 | |
| Meningovascular syphilis | 9 | 1 | 0 | 10 | |
| Tabes dorsalis | 2 | 0 | 0 | 2 | |
| General paresis | 3 | 0 | 0 | 2 | |
| Taboparesis | 3 | 0 | 0 | 2 | |
| Optic atrophy | 0 | 1 | 0 | 1 | |
| Erb's spastic paraplegia | 2 | 0 | 0 | 2 | |
| Total | 25 | 3 | 3 | 27 | |

[1] 2 of the 3 patients with questionable status when last examined have had no spinal fluid examinati
6 months after treatment; 1 patient who was re-treated 3 times has always had negative spinal fl
Wassermann reactions but he continues to have pleocytosis and high total protein determinations.

[2] This patient still had marked pleocytosis and elevated total protein values when last examine
months after re-treatment. He failed to return to us for a second re-treatment.

and 2, with 9 million units. Thus, asymptomatic neurosyphilis is no more easily arrested than any other type of neurosyphilis, and it requires as much treatment as do symptomatic cases.

Of the 38 failures, only 31 were re-treated by us, 3 having failed to return to us for re-treatment and 4 being still under observation without re-treatment because we consider them questionable failures. Three of the 4 have continued to have slight pleocytosis (4 to 10 cells) for a year or more after treatment, and 1 has had a very high total protein for over a year. All 4 have shown significant drops in the quantitative spinal fluid complement-fixation tests, and they have shown no clinical evidence of a progr
sive infection.

Of the 31 patients re-treated by us,
shown in table 4, 25 were re-treated o
once. The first re-treatment, as a ru
consisted of 6 to 8 million units of pe
cillin given over a period of 15 to 20 da
We now believe that a total dose of
least 10 million units should be used
the first re-treatment. Nevertheless,
our series, only 6 patients had to be
treated more than once; 3 were
treated twice, and 3 had 3 re-treatmen
The 3 patients re-treated only twice
ceived 6, 9, and 20 million units, resp
tively. Those re-treated 3 times recei
15, 12, and 30 million units, respectiv

at the second re-treatment; and 25, 30, and 60 million units, respectively, at the third re-treatment. As shown in table 4, 4 of the re-treated patients could not be considered satisfactory when last examined; 2 of them were re-treated only once (1 of these has not had a spinal fluid examination 6 months after re-treatment; 1 was still active when last examined 6 months after re-treatment, and he subsequently came under the care of a private physician); 1 was re-treated twice and has had no spinal fluid examination 6 months after his last re-treatment; 1 was re-treated 3 times and still has pleocytosis and first zone colloidal gold reactions. The diagnosis in the last case is open to question because the patient has always been neurologically asymptomatic, and he has never had a positive spinal fluid Wassermann test. He was first treated by us for secondary syphilis in February 1946 when he was found to have a high spinal fluid cell count and a first zone colloidal gold curve. In spite of three further treatments with 6, 9, and 30 million units of penicillin, respectively, he continues to have pleocytosis and an abnormal colloidal gold curve. He was diagnosed by us as asymptomatic early neurosyphilis only because no other cause for the pleocytosis and abnormal colloidal gold tests could be found. Following his first treatment for secondary syphilis he had a marked and rapid fall in the titers of the blood, as shown by the serologic test for syphilis, but none of the blood tests is as yet negative. In July 1950 the Kahn and complement-fixation titers of his blood were 1 and 3 units, respectively. The other two patients given three re-treatments were both asymptomatic cases. Both had high spinal fluid complement-fixation titers, pleocytosis, increased protein, and abnormal colloidal tests. Neither obtained a normal spinal fluid cell count until after the third re-treatment, with large doses of procaine penicillin in oil and aluminum monostearate given over a period of 30 days in one case and 39 days in the other. Both now have inactive spinal fluid findings, one having been inactive for 6 months and the other, for 16 months.

Thus, in a series of 438 patients treated for active neurosyphilis and followed up for 6 to 75 months, 427 were satisfactory when last examined. Of the remaining 11 patients, 3 failed to return to us for re-treatment of a definite relapse; 4 are still under observation as questionable failures because of slight pleocytosis or very high total protein values in the spinal fluid; 2 have had no spinal fluid examination 6 months after re-treatment; 1 failed to become inactive after a second re-treatment and went elsewhere for care; and 1 asymptomatic patient still has pleocytosis and first zone colloidal gold curves, in spite of negative complement-fixation reactions of the spinal fluid. In no case, as yet, have we found it necessary to resort to fever therapy. In our opinion, the results obtained with penicillin alone are superior to those previously obtained when we treated large series of neurosyphilitic patients with malaria therapy.

## Clinical Status of Patients

As previously stated, no attempt is made in this report to evaluate the effect of treatment on a purely clinical basis. Although all patients have had careful neurologic examinations by the senior author, we are convinced that no attempted summary of the clinical findings would be helpful in evaluating treatment. Most of our patients claimed to have definite subjective improvement after treatment. There was marked improvement in the mental and emotional status of some of the patients treated for general paresis. Certainly, the clinical improvement noted among our paretics treated with penicillin compares favorably with the improvement noted in paretics after malaria therapy at Bellevue Hospital in previous years. Perhaps the most striking clinical effect of penicillin has been in the cases of optic atrophy, wherein penicillin arrested further progress of amblyopia in 38 of 40 cases treated and followed up. Two patients who were already blind in one eye at the time of penicillin treatment became blind in the other eye following therapy. One of them had only light perception in one eye when treated, and the other patient had 20/100 vision in the good eye. In view of the fact that fever therapy, in some cases, failed to check progressive loss of vision in advanced optic atrophy, we believe that penicillin has proved as effective as fever therapy (if not more so) in arresting primary optic atrophy in neurosyphilis.

## Effect of Penicillin on Spinal Fluid Tests

As reported in numerous previous papers (*1, 2, 3*), we believe that the arrest of a neurosyphilitic infection can be demonstrated by serial spinal fluid examinations. Following treatment, increased cell counts of more than 4 per cubic millimeter should become normal within 3 to 6 months, and significant drops should occur in the reagin titer of the spinal fluid and abnormally high total protein values. Without exception, all the cases reported as having a satisfactory status in our series of patients have had significant drops in reagin titers and high total protein content of the spinal fluid within 6 months to a year after treatment. The new quantitative Lange colloidal gold test has been used in our spinal fluid examinations. This test is much more sensitive than the older test and abnormal quantitative values (obtained by adding the figures of all 10 tubes) continue to be abnormal for years after treatment. In most of our cases there was a significant fall in the quantitative colloidal gold tests within 1 year after treatment, but a few have remained at very high levels for more than 2 years and many continue to have abnormal reactions more than 4 years after treatment. The reason for the prolonged abnormal colloidal reactions is unknown to us. The colloidal gold reaction depends on the type of globulin present in the spinal fluid rather than on the amount. Why this globulin should continue to be present in the spinal fluid for years after the infection has been arrested deserves further investigation, but until the globulin fraction and its source are identified, the answer to this puzzling question will probably remain obscure.

## Penicillin Products Used

In the treatment of neurosyphilis v have used aqueous solutions of sodiu salts of amorphous penicillin and per cillin G, calcium salts of penicillin G oil and beeswax, and procaine penicill G in oil and aluminum monostearat Aqueous solutions were given at 3-ho intervals and the repository products, daily intervals. The best results we obtained when penicillin was given regular intervals for at least 15 day In our judgment, the preferred produ at present is procaine penicillin in c and aluminum monostearate. We hav had fewer reactions with this preparatic than with any other product, and v have been able to inject as much as 1,20 000 units daily without discomfort to t patient. Two of the patients re-treate three times had satisfactory spinal flu findings for the first time since admissi to our service, after they had receiv from 20 to 30 million units of procai penicillin in oil and aluminum monoste rate. Patients who received 600,000 uni of this preparation daily for 15 days, most cases had good clinical results, a with one exception the spinal fluid fir ings responded well.

## Summary

1. Of 438 patients treated with pe cillin alone for various types of act neurosyphilis, 400 became inactive and mained inactive for periods varying fr 6 to 75 months.

2. Of the 38 failures, only 31 were treated by us; 25 were re-treated o once; 3, twice; and 3, three times.

3. Of the 31 re-treated patients, 27 l inactive spinal fluid findings when l examined; 2 have not yet been follow up for 6 months after re-treatment failed to respond well to a second re-tre ment and went elsewhere for care; 1 s has marked pleocytosis and abnormal c loidal gold reactions but negative spi fluid Wassermann tests after a third treatment.

4. In the treatment of neurosyphi at various times we have used aque solutions of sodium penicillin, penici in oil and beeswax, and procaine p

cillin in oil and aluminum monostearate. All products in total doses of at least 6,000,000 units given over a period of 15 to 19 days have given good results.

5. Because of its relative freedom from reactions and its excellent therapeutic effect, procaine penicillin in oil and aluminum monostearate is now preferred for the treatment of all types of neurosyphilis. The routine treatment with this product consists of 15 daily injections of 600,000 units.

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# Penicillin Levels in Spinal Fluid After Intramuscular Injection of Procaine Penicillin[1]

**R. D. Wright, M. D.;[2] J. D. Thayer, Ph. D.;[3] F. P. Nicholson, M. D.;[4] and R. C. Arnold, M. D.[5]**

In the course of a broad program of erum penicillin level determinations fter the intramuscular injection of varius types of penicillin, it became evident that procaine penicillin in oil containing percent of aluminum monostearate, beause of its slow absorption, could, when njected every 24 hours, produce a stepke increasing blood level over as many days as the individual injection was deectable in the serum (*1*). In many patients a single injection produces a detectable serum level for 6 days. To take advantage of this sustained high level, a treatment schedule of 600,000 units every day for 6 days was instituted for the treatment of neurosyphilis. Serum levels as high as 0.6 units per cubic centimeter were demonstrated 24 hours after the last injection. When this became evident, a study was begun to determine whether penicillin was entering the spinal fluid.

Previous studies by other investigators (*2, 3*) have failed to detect a penicillin level in spinal fluid after extrathecal administration of therapeutic doses to individuals with normal meninges, although massive doses by intravenous drip have produced detectable levels. In certain cases of bacterial irritation of the meninges, penicillin appears to pass the irritated meninges more readily (*4, 5*).

### Method

In this study commercial procaine penicillin with a crystal size of 5 microns or less, suspended in sesame oil containing 2 percent of aluminum monostearate, was injected intramuscularly in doses of 600,000 units every 24 hours for 6 doses.

### Results

Of the 114 patients, 70 had negative spinal fluids as determined by cell count,

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Table 1.—*Penicillin levels in 198 spinal fluid specimens of 114 patients treated with six intramuscular injections of 600,000 units of procaine penicillin in oil containing 2 percent of aluminum monostearate every 24 hours*

| Hour at which injection given | Number of hours after first treatment | Penicillin level [1] for spinal fluid specimen No.— | | | | | | | | | | | Specimens in group showing T or more | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | Number | Percent |
| 0→ | 2 | 0.013 | T | — | — | — | — | — | — | — | — | — | 2 | 18 |
| | 12 | .014 | 0.013 | T | — | — | — | — | — | — | — | — | 3 | 27 |
| | 19 | T | — | — | — | — | — | — | — | — | — | — | 1 | 9 |
| 24→ | 26 | .036 | .021 | 0.018 | 0.015 | 0.015 | 0.013 | — | — | — | — | — | 6 | 55 |
| | 31 | .024 | .022 | .020 | .018 | .018 | .015 | 0.015 | 0.014 | 0.013 | — | — | 9 | [2] 82 |
| | 36 | .020 | .019 | .017 | .016 | .015 | .014 | .013 | T | T | — | — | 9 | [2] 82 |
| | 43 | .018 | .016 | .014 | .014 | .013 | .013 | .013 | T | — | — | — | 8 | 73 |
| 48→ | 50 | .058 | .035 | .019 | .017 | .016 | .015 | .014 | .013 | — | — | — | 8 | 73 |
| 72→ | 74 | .080 | .024 | .022 | .016 | .013 | .013 | — | — | — | — | — | 6 | 55 |
| 96→ | 98 | .074 | .028 | .026 | .025 | .019 | .018 | .015 | .014 | .013 | — | — | 9 | [2] 82 |
| 120→ | 122 | .053 | .018 | .023 | .023 | .020 | .018 | .017 | .014 | .014 | 0.013 | — | 10 | [2] 91 |
| 144→ | 146 | .022 | .017 | .016 | .015 | .015 | .015 | .014 | .014 | T | T | — | 10 | [2] 91 |
| | 170 | .024 | .023 | .017 | .017 | .014 | .013 | — | — | — | — | — | 6 | 55 |
| | 194 | .074 | .024 | .015 | .014 | .014 | .013 | .013 | T | — | — | — | 8 | 73 |
| | 218 | .014 | .014 | T | T | — | — | — | — | — | — | — | 4 | 36 |
| | 242 | .013 | T | — | — | — | — | — | — | — | — | — | 2 | 18 |
| | 266 | .018 | .013 | — | — | — | — | — | — | — | — | — | 2 | 18 |
| | 290 | .046 | — | — | — | — | — | — | — | — | — | — | 1 | 9 |

T=trace (less than 0.0125 unit per cc. but more than zero).
—=penicillin not detected.

[1] Expressed as decimal parts of 1 unit per cc.

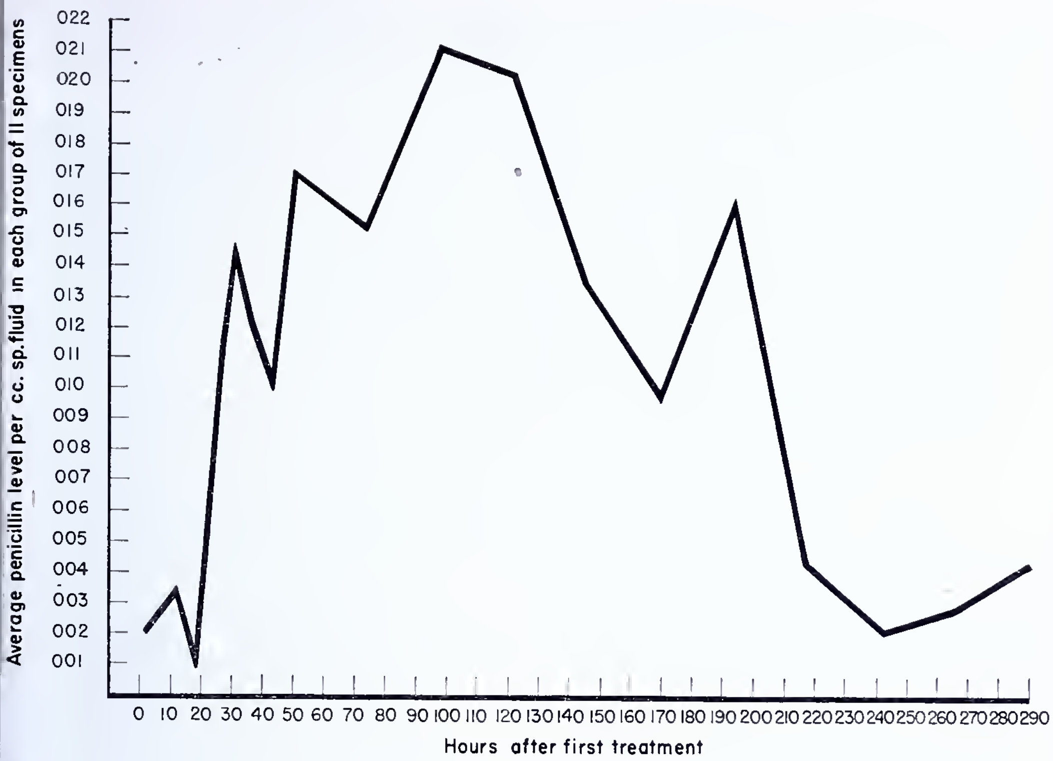

FIGURE 1.—Relationship of penicillin level to time interval after first treatment.

NOTE.—Curve drawn from table 1, assuming that trace is equivalent to 0.01 unit per cc. of spinal fluid. Penicillin levels expressed as thousandths of a unit of penicillin.

total protein, colloidal gold, and Kolmer complement-fixation tests; 37 had asymptomatic neurosyphilis; 1 had optic atrophy; 2 had tabes dorsalis; and 4 were not tested for syphilis. From these 114 patients, 198 spinal fluid specimens were drawn (table 1 and fig. 1). The interval between the first injection and taking the specimen ranged from 2 to 290 hours. At 2 hours after the first injection 9 percent of the first group of 11 specimens showed a trace of penicillin in the spinal fluid and 9 percent showed a quantitative level.[6] Eighteen percent of the 11 specimens taken at 12 hours showed a quantitative level, and 9 percent showed a trace. Nine percent of the 11 specimens taken at 19 hours showed a trace. At 26 hours, 2 hours after the second injection, 55 percent of the 11 specimens had a quantitative level. At 31 hours, 5 hours after the second injection, 82 percent showed a detectable level of penicillin.[7] Between 31 hours and 194 hours, penicillin was detectable in 75 percent[7] of the 110 specimens. In an occasional specimen it was still detectable after 290 hours (146 hours after the final injection of penicillin).

We also treated a group of patients who had primary or secondary syphilis with a single intramuscular injection of 300,000 units of procaine penicillin in oil containing 2 percent of aluminum monostearate. Penicillin levels were determined on the cerebrospinal fluid of 22 of these patients (table 2). A measurable penicillin level was obtained from the specimens of 18 percent of the patients. A trace of penicillin was detectable in the specimens of an additional 36 percent of the patients.

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[6] Spinal fluid determinations were made by the cup-plate assay method, using *Sarcina lutea* as the test organism (6, 7).

[7] This percentage is significantly above the average for all specimens.

**Table 2.—*Penicillin levels in the spinal fluid specimens of 22 patients treated with a single intramuscular injection of 300,000 units of microcrystal procaine penicillin in oil containing 2 percent of aluminum monostearate***

| Number of hours after treatment | Penicillin level [1] for spinal fluid specimen No. — | | | | | | | | | | | Specimens in grou showing T or more | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | Number | Percent |
| 24 | 0.057 | 0.020 | 0.013 | T | T | T | — | — | — | — | — | 6 | 5 |
| 72 | .013 | T | T | T | T | T | — | — | — | — | — | 6 | 5 |

T=trace (less than 0.0125 unit per cc. but more than zero).
—=penicillin not detected.

[1] Expressed as decimal parts of 1 unit per cc.

## Summary and Conclusions

1. Penicillin levels in the cerebrospinal fluid were determined on 198 specimens taken from 114 patients at various time intervals after commercial procaine penicillin suspended in sesame oil containing 2 percent of aluminum monostearate was injected intramuscularly in doses of 600,000 units every 24 hours for 6 doses. Detectable levels of penicillin were obtained from 2 to 290 hours after beginning the injections, with 82 percent of the specimens showing a level at 31 hours and 91 percent at 122 hours.

2. In a second group of 22 patients who received one intramuscular injection of 300,000 units of procaine penicillin in oil containing 2 percent of aluminum monostearate, 4 of the specimens showed a measurable level of penicillin in the spinal fluid, and 8 showed a trace.

3. Penicillin can be demonstrated in the spinal fluid of a large percentage of patients following one to six intramuscular injections of moderate amounts of microcrystal procaine penicillin in oil containing 2 percent of aluminum monostearate.

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# CURRENT NOTES AND REPORTS

## National Social Hygiene Day, February 7, 1951

Community observance of National Social Hygiene Day, February 7, is urged by the American Social Hygiene Association. The theme for 1951 is "Safeguard Our Stronghold . . . The Family."

National Social Hygiene Day is observed each year to stimulate public interest and support for social hygiene objectives. The broad goals of the Association include the repression of prostitution and, more important, the preservation and conservation of wholesome family life.

Particular effort is directed this year to helping young people meet the challenge of marriage and parenthood in a changing, threatening world. Helping parents to meet the peculiar demands of our times in their task of child development is also an important aim. Vital, too, is the fight to preserve the health of the American people by warring against the still unbeaten enemy—venereal disease.

Character guidance is stressed in the colorful kit of materials assembled to help communities plan their observance. These program and publicity aids are available upon request to the American Social Hygiene Association, 1790 Broadway, New York 19, N. Y.

## VDRL Training Courses Scheduled

A schedule of laboratory training courses for 1951 has been announced by the Venereal Disease Research Laboratory. Two-week courses in the "Laboratory Diagnosis of Syphilis" will be offered for the periods February 12–23, March 12–23, April 16–27, June 4–15, September 10–21, and October 22 to November 2. "Laboratory Diagnosis of the Venereal Diseases" will be the subject of a 1-week training course on May 7–11. During the week May 14–18, "*Treponema Pallidum* Immobilization" will be demonstrated. A 3-week course in "Preparation and Standardization of Serologic Reagents Used in the Laboratory Diagnosis of Syphilis" will be offered on November 5–23. Information and application forms should be requested from the Officer in Charge, Laboratory Training Services, Communicable Disease Center, United States Public Health Service, P. O. Box 185, Chamblee, Ga.

## Yugoslav Volunteers Aid in Anti-VD Program

Specially trained high school graduates are proving to be an invaluable aid in the Yugoslav public health campaign against endemic syphilis, Dr. E. Gurney Clark, consultant in venereal disease of the World Health Organization, reports in the WHO Newsletter for October.

"Dr. Clark has just completed a study in Yugoslavia on behalf of WHO and the UN International Children's Emergency Fund in the first all-out campaign against endemic syphilis, which is usually transmitted by nonvenereal contacts among children.

"Although endemic syphilis has been a major public health problem in Bosnia and Herzegovina for many years, previous efforts to control the disease were not successful. The campaign now organized by the Yugoslav Government with technical advice from WHO and with UNICEF supplies of penicillin and equipment got under way in 1948.

"As an example of the Yugoslavs' care in using the supplies, Dr. Clark mentions the fact that empty penicillin vials, instead of being thrown away, are washed out with pure oil, which gathers the last drops of penicillin. This is then used to treat minor infections in children not under treatment for syphilis.

"A first-rate organization has been put together, according to Dr. Clark, to achieve top results in the campaign. It includes traveling teams, mobile laboratories, and an excellent record card system to allow for retesting and rechecks, and the participation of physicians, medical students, and even middle school graduates.

"The latter receive a brief period of training and show remarkable technical competence. Boys and girls between the ages of 18 and 22 are used for health propaganda in the villages, for registering the population, taking blood samples, and injecting penicillin in positive reactors.

"From the scientific point of view, the Yugoslav antisyphilis drive is yielding interesting results both in the clinical and in the epidemiologic fields. Endemic syphilis is prevalent in many Balkan countries as well as in Asia and other areas, and the Yugoslav attempt at eradication will be of value to other countries."

### New "Facts About Syphilis" Available

A revised edition of "Facts About Syphilis" has been published. This 27-page booklet was originally assembled for newspapers to use as background material for stories about syphilis. Now it has been enlarged with charts and graphs to highlight current trends in syphilis infection as carefully as it tells the history of syphilis and its treatment through this and past centuries.

"Facts" places emphasis on latent and congenital syphilis. Although written primarily for the layman, it should find interested readers among professional people as well. Single copies are available upon request to Dr. Theodore J. Bauer, Chief, Division of Venereal Disease, U. S. Public Health Service, Washington 25, D. C.

## CURRENT LITERATURE

### ACTA DERMAT.-VENEREOL., STOCKHOLM

Penicillin-arsenoxide-bismuth treatment of early syphilis. Follow-up examinations with up to 2 years observation time. Niels Danbolt and Tore Berdal. Acta dermat.-venereol., 30: 354–361, No. 4, 1950.

Of a total of 104 patients treated at the Dermatological Clinic of the University, Oslo, in 1947, 6 clinical and serologic relapses were observed in 84 patients for a cumulative failure rate of 7.14 percent in the 2-year period. A review of the literature and the results of this study made the authors feel that there is reason to continue this therapeutic method in patients who can be hospitalized.

Results of single and multiple injection schedules for the treatment of early syphilis with procaine penicillin in oil and aluminum monostearate. D. K. Kitchen, C. R. Rein, and E. W. Thomas. Acta dermat.-venereol., 30: 362–371, No. 4, 1950.

One hundred and forty-three patients were treated with four schedules of injections of from 1.2 million to 4.8 million units of penicillin. Of these, 17 were lost from observation and of the remaining 126 patients, 113 have become either serologic negative or shown a marked serologic improvement. From the results of this study and a review of the literature the authors conclude that penicillin is the product of choice in the treatment.

### AM. HEART J., ST. LOUIS

Myocardial infarction due to syphilitic coronary ostial stenosis. William B. Scharfman, Jacques B. Wallach, and Alfred Angrist. Am. Heart J., 40: 603–613, Oct. 1950.

The literature of the past 20 years is reviewed and a report is presented of seven patients seen at Queens General Hospital, New York, with myocardial infarction due to syphilitic ostial stenosis.

Two of these also had coronary arteriosclerosis. Clinical features of this syndrome and possible explanations for its rarity are discussed.

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## AM. J. DIGEST. DIS., FORT WAYNE

Chloromycetin and aureomycin in proctology. Alfred J. Cantor. Am. J. Digest. Dis., 17 : 340–342. Oct. 1950.

The author reviews the literature on the use of these antibiotics in various conditions, including streptomycin-resistant granuloma inguinale and lymphogranuloma venereum. Gonococcic proctitis and perianal lesions of syphilis are under experimental therapy with Chloromycetin; however, clinical evaluation is not yet complete.

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## AM. J. M. SC., PHILADELPHIA

Intradermal tests in the diagnosis of certain infectious diseases. Herman Beerman and Norman R. Ingraham, Jr. Progress of Medical Science. Am. J. M. Sc., 220 : 435–463, Oct. 1950.

An extensive review of the literature on cutaneous tests in certain infections, including the venereal diseases, indicates that there is still much unknown about this problem.

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## AM. J. OBST. & GYNEC., ST. LOUIS

*Trichomonas vaginalis* vaginitis: treatment with a new surface-active trichomonacide. J. Mason Hundley, William K. Diehl, Herman A. Shelanski, and Robert L. Stone. Am. J. Obst. & Gynec., 60 : 843–850, Oct. 1950.

A new technic for the treatment of *Trichomonas vaginalis* vaginitis, requiring only a speculum and eliminating the need for "ballooning" insufflation, as well as for preparatory washing and drying of the irritated vagina, is reported. The technic, which is made possible by the use of a trichomonacide marketed under the trade name of Tetronyl, was successful in treating 94 of 100 clinic patients at the Hospital of the University of Maryland.

Granuloma inguinale of the cervix uteri and vulva treated with streptomycin. Randolph H. Hoge and Arnold M. Salzberg. Am. J. Obst. & Gynec., 60 : 911–913, Oct. 1950.

A report is presented of treatment with streptomycin of five Negro women with granuloma inguinale of the vulva and three with granuloma inguinale of the cervix uteri at the Department of Gynecology, Medical College of Virginia.

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## AM. J. PUB. HEALTH, NEW YORK

A plan to simplify premarital laws. N. J. Fiumara, E. W. Colby, H. P. Talbot, J. H. Lade, R. F. McAteer, R. B. Aiken, and R. P. Jones. Am. J. Pub. Health, 40 : 1238–1240, Oct. 1950.

The problem of interstate marriages, due to the disparity in the laws of all States having premarital laws, is outlined and a solution for the problem is offered. The authors recommend that all States should adopt uniform or compatible premarital laws and agree upon a standard premarital certificate acceptable in any State.

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## ANGIOLOGY, BALTIMORE

Aneurysm of the abdominal aorta. Report of two cases treated by "cutis grafting." Eugene L. Lowenberg. Angiology, 1 : 396–404, Oct. 1950.

Symptoms and signs of abdominal aneurysm, including those due to syphilis, prognosis, signs and symptoms of rupture, pathology, and treatment are reviewed. A modification of the cellophane fibrosis procedure known as "cutis grafting," wherein an effort is made to encircle completely the aneurysm with cutis, is described. The cutis grafting of two aortic aneurysms is reported.

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## ARCH. DERMAT. & SYPH., CHICAGO

Skin tests in various infectious and parasitic diseases. A summary in table form. Rudolf L. Baer and Meyer Yanowitz. Arch. Dermat. & Syph., 62 : 491–501, Oct. 1950.

Skin tests are utilized to establish whether exposure has taken place, whether the skin is in a state of relative susceptibility or resistance, and to help in making the diagnosis and prognosis. A positive reaction from *Hemophilus ducreyi* vaccine indicates past or present chancroid infection. It occurs in 70 to 80 percent of infected subjects. The same is generally true for reactions of

ARCH. DERMAT. & SYPH., CHICAGO—CONTINUED

infected chick embryo vaccine used for testing lymphogranuloma venereum. Skin tests for granuloma inguinale and syphilis are not generally acceptable.

Squamous cell carcinoma simulating granuloma inguinale. Arthur B. Kern. Arch. Dermat. & Syph., 62: 515–525, Oct. 1950.

Three case histories are presented in which squamous cell carcinoma was originally diagnosed and treated as granuloma inguinale. Importance of early biopsy is stressed in all cases diagnosed as granuloma inguinale and which fail to respond to antibiotic therapy.

Effectiveness of antichaneroidal drugs tested by heteroinoculation of bubo fluid from untreated donor. R. R. Willcox. Arch. Dermat. & Syph., 62: 533–539, Oct. 1950.

In 10 experiments, 90 people were inoculated and then treated with one of nine treatment schedules. Controls consisted of 30 untreated persons. Sulfathiazole, streptomycin, aureomycin, and chloramphenicol proved efficient against the experimental infection. Penicillin, if given in a manner to maintain high serum concentration, was also effective. Antimonials, bismuth preparations, and neoarsphenamine proved ineffectual. All persons used in the test were African Negroes.

BETTER HEALTH, LINCOLN

Highlights in public health progress in 1949. Better Health, 9: 2, 4, Mar.–Apr. 1950.

Nebraska Department of Health annual report shows 150,000 blood specimens were examined in the State laboratory for syphilis, and there was a 20-percent decrease in reported cases.

BOL. OFIC. SAN. PANAM., WASHINGTON

Influencia de un programa profiláctico penicilinico en la incidencia de las infermedades venéreas. (Influence of a penicillin prophylactic program on the venereal disease incidence.) D. R. Gooden. Bol. Ofic. san. panam., 29: 1051–1054, Oct. 1950.

In an experimental 6-month venereal disease control campaign begun in September 1949 by the Mexican government and the Pan American Sanitary Bureau, one weekly injection of 300,000 Oxford units of penicillin was given to every suspected individual in the Tijuana district. The results obtained were considered to have been most satisfactory.

BULL. VANCOUVER M. A., VANCOUVER

Interpretations of serology in the diagnosis of syphilis. C. L. Hunt. Bull. Vancouver M. A., 26: 291–294, Aug. 1950.

The difficulties involved in interpreting serologic findings are discussed and suggestions given to aid in making accurate interpretations in diagnosing syphilis.

CHICAGO M. SOC. BULL., CHICAGO

The newer antibiotics. Yale Kneeland, Jr. Chicago M. Soc. Bull., 53: 248–251, Sept. 30, 1950.

This paper, read at the Sixth Clinical Conference of the Chicago Medical Society, March 3, 1950, includes a discussion of streptomycin, polymyxin, bacitracin, chloramphenicol, aureomycin, and terramycin. Pharmacology, toxicity, and clinical application of these antibiotics are reviewed.

HAHNEMANNIAN, WEST PITTSTON

Urology and antibiotics with special reference to office practice. Ralph E. Morgan. Hahnemannian, 85: 7–12, Jan.–Mar. 1950.

Among the urologic conditions frequently encountered in office practice the author considers gonorrhea and reviews the treatment with penicillin of this disease. The use of other antibiotics in urologic conditions is briefly reviewed.

Present status of neurosyphilis. Charles B. Reitz. Hahnemannian, 85: 124–132, July–Sept. 1950.

The author discusses the incidence, laboratory findings, diagnosis, pathology, and prognosis of neurosyphilis in its various forms.

HEALTH CENTER J. OHIO STATE UNIV., COLUMBUS

The limitations of preconceptions in clinical pathology. Harry L. Reinhart. Laboratory Aids in Diagnosis. Health Center J. Ohio State Univ., 3: 62–64, Mar. 1950.

HEALTH CENTER J. OHIO STATE UNIV., COLUMBUS—CONTINUED

The use and interpretation of results of serologic tests for syphilis are discussed, with particular emphasis on the limitations of preconceptions of infallibility of the test which exist among physicians.

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HEALTH NEWS, ALBANY

Sight saving. The family physician can do much to prevent blindness as a part of good medical care to his patients. Franklin M. Foote. Health News, 27 : 3–9, Oct. 1950.

Prenatal serologic tests, use of prophylactic drops in the baby's eyes, and immediate penicillin treatment of suspected gonorrheal infections are listed as measures which will help prevent blindness in children.

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INTERNAT. DIGEST OF HEALTH LEGISLATION, (WHO), GENEVA

France. Control of venereal diseases. Internat. Digest of Health Legislation, (WHO), 2 : 78–79, 1950.

Act No. 48–1086, dated 8 July 1948, deals with case finding and treatment of venereal diseases. Act No. 48–1290, dated 18 August 1948, deals with organization and functioning of venereal disease clinics.

France. Serology. Internat. Digest of Health Legislation, (WHO), 2 : 80, 1950.

Order of 16 November 1948 establishes in faculties of medicine and pharmacy and joint faculties of medicine and pharmacy a diploma in serology as applied to the diagnosis of venereal diseases.

Sweden. Venereal diseases. Internat. Digest of Health Legislation, (WHO), 2 : 114–121, 1950.

Act No. 98, dated 20 June 1948, and all amendments to the Act passed to 30 June 1948 are concerned with case finding, diagnosis, treatment, and control of venereal diseases.

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INTERNAT. HEALTH BULL. LEAGUE RED CROSS SOCIETIES, GENEVA

International Union against the Venereal Diseases. General Assembly, Zurich, 28th July—2nd August 1950. Internat. Health Bull. League Red Cross Societies, 2 : 41, July–Sept. 1950.

Delegates from 27 countries and observers from WHO and League of Red Cross Societies attended. Topics discussed included treatment of congenital syphilis, principles of antivenereal health education, how to take far-reaching changes in treatment into account in propaganda, problem of sexual education, and the educational role of the Red Cross. Professor E. H. Hermans of the Netherlands was elected president.

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J. BACT., BALTIMORE

The relationship between immobilizing and spirocheticidal antibodies against *Treponema pallidum*. Frederick A. Thompson, Jr., Bernard G. Greenberg, and Harold J. Magnuson. J. Bact., 60 : 473–480, Oct. 1950.

In an experiment with a syphilitic serum pool obtained from a group of patients at the Eastern Medical Center, Durham, N. C., and a normal serum pool obtained from laboratory personnel it was demonstrated that spirochetes immobilized in the test were not infectious and were, therefore, presumably dead.

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J. CLIN. INVESTIGATION, CINCINNATI

Cerebral blood flow and oxygen consumption in neurosyphilis. John L. Patterson, Jr., Albert Heyman, and Fenwick T. Nichols, Jr. J. Clin. Investigation, 29 : 1327–1334, Oct. 1950.

This is a report on studies of 58 patients at the Grady Memorial Hospital, Atlanta, and 16 control subjects to determine the cerebral blood flow, oxygen consumption, and vascular resistance in various types of neurosyphilis by the nitrous oxide technic.

The effects of induced fever on cerebral functions in neurosyphilis. Albert Heyman, John L. Patterson, Jr., and Fenwick T. Nichols, Jr. J. Clin. Investigation, 29 : 1335–1341, Oct. 1950.

From studies of the effects of fever induced by typhoid bacterial pyrogen or malaria in 27 patients with neurosyphilis, it is concluded that the therapeutic effects of fever probably are not brought about solely by changes in cerebral blood flow.

J. MAINE M. A., PORTLAND

Aureomycin in ocular syphilis. James E. Poulin. J. Maine M. A., 41: 357–359, Sept. 1950.

Case reports are presented of four patients with ocular syphilis which responded to aureomycin after antisyphilitic therapy had proved of no avail.

J. PHILIPPINE M. A., MANILA

The joint cooperative program for the control of venereal disease in the Philippines. Florencio Z. Cruz. J. Philippine M. A., 26: 307–313, July 1950.

Purpose of paper was to inform the medical profession in the Philippines and the government about the tangible results of a health program carried out by the Governments of the Republic of the Philippines and the United States. Accomplished activities in the venereal disease control program are presented for period of July 1946 to June 1949.

J. SOCIAL HYG., NEW YORK

Case finding around the country. The hunting of the spirochete. J. Social Hyg., 36: 291–304, Oct. 1950.

Educational and case-finding programs during venereal disease control campaigns in Washington, D. C., Philadelphia, Pa., St. Louis, Mo., and Mississippi are described and their effectiveness evaluated.

Penicillin is not enough. Social and educational factors in the prevention of venereal disease, and how San Francisco deals with VD and sexual promiscuity in a community program based on education for family life. Richard A. Koch. J. Social Hyg., 36: 305–316, Oct. 1950.

Development of a series of community-wide programs directed toward the solution of the social problems related to venereal disease control in San Francisco is described. Belief is expressed that venereal disease prevention is not a medical problem alone and that venereal disease is just one of the casualties resulting from antisocial or irresponsible social behavior.

M. CLIN. NORTH AMERICA, PHILADELPHIA

The clinical use of antibiotics. Perrin H. Long. Symposium on Medical Therapeutics. M. Clin. North America, 34: 307–318, Mar. 1950.

Tyrothricin, bacitracin, penicillin, streptomycin or dihydrostreptomycin, aureomycin, and chloramphenicol are considered from the standpoint of clinical pharmacology and toxicology, toxicity, bacterial resistance, effectiveness in various infections, dosage, and their use in combinations.

Current use of penicillin and streptomycin. Wallace E. Herrell and William E. Wellman. Symposium on Medical Therapeutics. M. Clin. North America, 34: 319–330, Mar. 1950.

In discussing current application of these antibiotics the authors consider drug resistance, dosage, method of administration, clinical applications in infections, and toxic reactions. Prophylactic use of penicillin is also considered.

Present status of the treatment of syphilis. Harold A. Tucker. Symposium on Medical Therapeutics. M. Clin. North America, 34: 495–507, Mar. 1950.

A brief résumé of the present status of treatment of the various manifestations of syphilis is presented, together with tables of recommended therapeutic regimens by diagnostic categories and schedules of posttreatment follow-up.

Virus diseases: their diagnosis and management. Louis Weinstein. M. Clin. North America, 34: 1305–1322, Sept. 1950.

Among the viral diseases discussed the author includes lymphogranuloma venereum and epidemic keratoconjunctivitis.

Modern psychiatric treatment. William L. Holt. M. Clin. North America, 34: 1499–1506, Sept. 1950.

Among mental disturbances considered in this discussion the author includes neurosyphilis for which modern treatment includes penicillin and shock therapy.

M. TIMES, EAST STROUDSBURG

Health Department distributes procaine penicillin. M. Times, 78: 432, Sept. 1950.

The requirements are listed for obtaining procaine penicillin G with 2 percent aluminum monostearate which is distributed to physicians without charge by the New York City Department of Health for the treatment of syphilis and gonorrhea.

NEW ORLEANS M. & S. J., NEW ORLEANS

Factors influencing the choice of antibiotics in therapy. Alfred B. Longacre. New Orleans M. & S. J., 103: 160–167, Oct. 1950.

The importance of strain specificity as related to antibiotic sensitivity is emphasized. Individual properties of different antibiotics, including resistance, antibiotic fastness, and dependency and the possible relationship of bacterial and antibiotic synergism are discussed.

PUB. HEALTH NEWS, TRENTON

Mass multiple test screening—A new survey technique. E. M. Holmes, Jr., Paul W. Bowden, and James H. Stone. Pub. Health News, 31: 315–319, Oct. 1950.

The multiphasic screening program of the Richmond City Department of Health is described. A brief history of the development of case-finding and contact-tracing procedures in venereal disease control is given.

PUB. HEALTH REP., WASHINGTON

Multiple screening and specialized programs. Joseph W. Mountin. Pub. Health Rep., 65: 1359–1368, Oct. 20, 1950.

Author discusses advantages of a multiple screening program as a public health tool and the contribution it is possible to make in control of many diseases which go unchecked. Screening is only the beginning of a program which must include diagnosis, follow-up, and treatment. Venereal disease programs have shown that mass application is possible.

ROCKY MOUNTAIN M. J., DENVER

Ambulatory treatment of syphilis. Case holding experiences in outpatient management of ambulatory patients treated with penicillin. R. M. Sorensen and R. D. Shannon. Rocky Mountain M. J., 47: 760–765, Oct. 1950.

Experience with holding 200 patients treated with single daily injections of 600,000 units of procaine penicillin in oil with 2 percent aluminum monostearate over periods of 10, 15, and 20 days is described. Of these, 78 percent completed with no lapse, and 12 percent completed with one or more lapses. By arranging treatment to fit the patient's daily routine, private physicians can duplicate these results in their offices.

WHO NEWSLETT., GENEVA

WHO at work for VD control in Haiti. WHO Newslett., No. 8–9: 1, 4, Aug.–Sept. 1950.

An example of a day's work for doctors and nurses for WHO is excerpted from the diary of Dr. Sacha Levitan, WHO adviser in Haiti's campaign against yaws and syphilis.

WHO at work for VD control in Himalayan foothills. WHO Newslett., No. 8–9: 1–2, Aug.–Sept. 1950.

An account of the work done in the Himachal Pradesh section of India where the population was 50 percent infected with syphilis is given. Difficulties encountered are described. The practical experience gained by the team led by Dr. J. C. Cutler will be given general application in similar areas throughout Asia.

Yaws control. WHO Newslett., No. 8–9: 4. Aug.–Sept. 1950.

Program against yaws and syphilis is being undertaken in Indonesia where facilities are provided for penicillin treatment of 12 million people with yaws. The Thai Government is launching a yaws project in the Ratchburi Province, where in some communities 10 percent of the children have the disease.

WISCONSIN M. J., MADISON

Diagnosis and treatment of syphilis. G. A. Cooper. Wisconsin M. J., 49: 911–914, Oct. 1950.

This article was written as a guide for physicians in the diagnosis and treatment of syphilis. Interpretation of tests, diagnosis by stages, general control measures, reactions to penicillin treatment, and effect of penicillin therapy on the serologic reaction are discussed. A chart is included showing signs and symptoms to look for in the diagnosis and treatment schedules for various stages of syphilis.

## Results of Diagnostic Procedures in Evaluation of Serodiagnostic Methods, 1950

[Based upon results on serums from 224 known syphilitic donors and 150 presumably nonsyphilitic donors]

| Laboratory and test | Syphilitic group | | | | | | | | Nonsyphilitic group | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Serums tested | Positive | | Doubtful | | Negative | | Sensitivity | Serums tested | Positive | | Doubtful | | Negative | | Specificity |
| | | Number | Percent | Number | Percent | Number | Percent | | | Number | Percent | Number | Percent | Number | Percent | |
| Eagle flocculation test: | | | | | | | | | | | | | | | | |
| Control | 224 | 152 | 67.9 | 13 | 5.8 | 59 | 26.3 | 70.8 | 150 | 0 | 0 | 0 | 0 | 150 | 100.0 | 100.0 |
| District of Columbia | 223 | 153 | 68.6 | 5 | 2.2 | 65 | 29.1 | 69.7 | 150 | 0 | 0 | 0 | 0 | 150 | 100.0 | 100.0 |
| Florida | 217 | 166 | 76.5 | 7 | 3.2 | 44 | 20.3 | 78.1 | 149 | 0 | 0 | 0 | 0 | 149 | 100.0 | 100.0 |
| Maryland | 222 | 162 | 73.0 | 0 | 0 | 60 | 27.0 | 73.0 | 150 | 0 | 0 | 0 | 0 | 150 | 100.0 | 100.0 |
| Vermont | 221 | 150 | 67.9 | 8 | 3.6 | 63 | 28.5 | 69.7 | 148 | 0 | 0 | 0 | 0 | 148 | 100.0 | 100.0 |
| Hinton standard flocculation test: | | | | | | | | | | | | | | | | |
| Control | 222 | 163 | 73.4 | 9 | 4.0 | 50 | 22.5 | 75.4 | 150 | 0 | 0 | 0 | 0 | 150 | 100.0 | 100.0 |
| Maine | 221 | 133 | 60.2 | 24 | 10.9 | 64 | 29.0 | 65.6 | 150 | 0 | 0 | 0 | 0 | 150 | 100.0 | 100.0 |
| Maryland | 222 | 163 | 73.4 | 0 | 0 | 59 | 26.6 | 73.4 | 149 | 0 | 0 | 0 | 0 | 149 | 100.0 | 100.0 |
| Missouri | 219 | 159 | 72.6 | 21 | 9.6 | 39 | 17.8 | 77.4 | 149 | 1 | .7 | 10 | 6.7 | 138 | 92.6 | 96.0 |
| New Hampshire | 205 | 143 | 69.8 | 7 | 3.4 | 55 | 26.8 | 71.5 | 142 | 0 | 0 | 1 | .7 | 141 | 99.3 | 99.7 |
| Rhode Island | 219 | 159 | 72.6 | 3 | 1.4 | 57 | 26.0 | 73.3 | 149 | 0 | 0 | 0 | 0 | 149 | 100.0 | 100.0 |
| Utah | 223 | 186 | 83.4 | 0 | 0 | 37 | 16.6 | 83.4 | 150 | 4 | 2.7 | 0 | 0 | 146 | 97.3 | 97.3 |
| West Virginia | 168 | 119 | 70.8 | 11 | .5 | 38 | 22.6 | 74.1 | 91 | 0 | 0 | 0 | 0 | 91 | 100.0 | 100.0 |
| Kahn standard: | | | | | | | | | | | | | | | | |
| Control | 224 | 156 | 69.6 | 13 | 5.8 | 55 | 24.6 | 72.5 | 150 | 0 | 0 | 0 | 0 | 150 | 100.0 | 100.0 |
| Alabama | 221 | 137 | 62.0 | 15 | 6.8 | 69 | 31.2 | 65.4 | 150 | 0 | 0 | 0 | 0 | 150 | 100.0 | 100.0 |
| Arizona | 221 | 134 | 60.6 | 17 | 7.7 | 70 | 31.7 | 64.5 | 150 | 0 | 0 | 0 | 0 | 150 | 100.0 | 100.0 |
| Colorado | 217 | 143 | 65.9 | 13 | 6.0 | 61 | 28.1 | 68.9 | 118 | 0 | 0 | 0 | 0 | 118 | 100.0 | 100.0 |
| Delaware | 224 | 147 | 65.6 | 12 | 5.4 | 65 | 29.0 | 68.3 | 150 | 0 | 0 | 0 | 0 | 150 | 100.0 | 100.0 |
| Florida | 221 | 166 | 75.1 | 7 | 3.2 | 48 | 21.7 | 76.7 | 149 | 0 | 0 | 0 | 0 | 149 | 100.0 | 100.0 |
| Georgia | 223 | 136 | 61.0 | 23 | 10.3 | 64 | 28.7 | 66.1 | 149 | 1 | .7 | 0 | 0 | 148 | 99.3 | 99.3 |
| Idaho | 221 | 158 | 71.5 | 10 | 4.5 | 53 | 24.0 | 73.8 | 150 | 0 | 0 | 0 | 0 | 150 | 100.0 | 100.0 |
| Illinois | 221 | 157 | 71.0 | 16 | 7.2 | 48 | 21.7 | 74.7 | 150 | 0 | 0 | 1 | .7 | 149 | 99.3 | 99.7 |
| Kansas | 220 | 155 | 70.5 | 14 | 6.4 | 51 | 23.2 | 73.6 | 150 | 0 | 0 | 0 | 0 | 150 | 100.0 | 100.0 |
| Kentucky | 209 | 97 | 46.4 | 18 | 8.6 | 94 | 45.0 | 50.7 | 149 | 0 | 0 | 0 | 0 | 149 | 100.0 | 100.0 |
| Louisiana | 221 | 166 | 75.1 | 3 | 1.4 | 52 | 23.5 | 75.8 | 147 | 0 | 0 | 0 | 0 | 147 | 100.0 | 100.0 |
| Maine | 224 | 154 | 68.8 | 11 | 4.9 | 59 | 26.3 | 71.2 | 150 | 0 | 0 | 0 | 0 | 150 | 100.0 | 100.0 |
| Michigan | 224 | 140 | 62.5 | 14 | 6.2 | 70 | 31.3 | 65.6 | 150 | 0 | 0 | 0 | 0 | 150 | 100.0 | 100.0 |
| Minnesota | 158 | 103 | 65.2 | 25 | 15.8 | 30 | 19.0 | 73.1 | 141 | 0 | 0 | 0 | 0 | 141 | 100.0 | 100.0 |
| Montana | 222 | 163 | 73.4 | 15 | 6.8 | 44 | 19.8 | 76.8 | 149 | 0 | 0 | 0 | 0 | 149 | 100.0 | 100.0 |
| Nevada | 224 | 168 | 75.0 | 1 | .4 | 55 | 24.6 | 75.2 | 150 | 2 | 1.3 | 1 | .7 | 147 | 98.0 | 98.3 |
| New Mexico | 221 | 153 | 69.2 | 15 | 6.8 | 53 | 24.0 | 72.6 | 150 | 2 | 1.3 | 2 | 1.3 | 146 | 97.3 | 98.0 |
| Ohio | 221 | 148 | 67.0 | 18 | 8.1 | 55 | 24.9 | 71.0 | 149 | 0 | 0 | 0 | 0 | 149 | 100.0 | 100.0 |
| Oregon | 223 | 156 | 70.0 | 6 | 2.7 | 61 | 27.4 | 71.3 | 150 | 0 | 0 | 0 | 0 | 150 | 100.0 | 100.0 |
| South Dakota | 148 | 86 | 58.1 | 19 | 12.8 | 43 | 29.1 | 64.5 | 141 | 0 | 0 | 0 | 0 | 141 | 100.0 | 100.0 |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tennessee | 224 | 134 | 59.8 | 22 | 9.8 | 68 | 30.4 | 64.7 | 150 | 0 | 0 | 0 | 0 | 150 | 100.0 | 100.0 |
| Texas | 216 | 159 | 73.6 | 6 | 2.8 | 51 | 23.6 | 75.0 | 150 | 0 | 0 | 0 | 0 | 150 | 100.0 | 100.0 |
| Utah | 224 | 173 | 77.2 | 5 | 2.2 | 46 | 20.5 | 78.3 | 150 | 2 | 1.3 | 0 | 0 | 148 | 98.7 | 98.7 |
| Virginia | 224 | 165 | 73.7 | 10 | 4.5 | 49 | 21.9 | 75.9 | 150 | 0 | 0 | 0 | 0 | 150 | 100.0 | 100.0 |
| Washington | 220 | 135 | 61.4 | 17 | 7.7 | 68 | 30.9 | 65.2 | 148 | 0 | 0 | 0 | 0 | 148 | 100.0 | 100.0 |
| West Virginia | 199 | 152 | 76.4 | 0 | 0 | 47 | 23.6 | 76.4 | 148 | 0 | 0 | 0 | 0 | 148 | 100.0 | 100.0 |
| Wisconsin | 224 | 170 | 75.9 | 5 | 2.2 | 49 | 21.9 | 77.0 | 149 | 0 | 0 | 0 | 0 | 149 | 100.0 | 100.0 |
| Wyoming | 223 | 154 | 69.1 | 9 | 4.0 | 60 | 26.9 | 71.1 | 147 | 1 | .7 | 3 | 2.0 | 143 | 97.3 | 98.3 |
| Hot Springs Medical Center | 205 | 139 | 67.8 | 15 | 7.3 | 51 | 24.9 | 71.5 | 145 | 0 | 0 | 0 | 0 | 145 | 100.0 | 100.0 |
| VD Research Laboratory | 222 | 152 | 68.5 | 25 | 11.3 | 45 | 20.3 | 74.1 | 150 | 0 | 0 | 1 | .7 | 149 | 99.3 | 99.7 |
| VDRL slide test: |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Control | 224 | 161 | 71.9 | --- | --- | 63 | 28.1 | 71.9 | 150 | 0 | 0 | --- | --- | 150 | 100.0 | 100.0 |
| Alabama [1] | 218 | 157 | 72.0 | --- | --- | 61 | 28.0 | 72.0 | 149 | 1 | .7 | --- | --- | 148 | 99.3 | 99.3 |
| Arizona [1] | 223 | 143 | 64.1 | --- | --- | 80 | 35.9 | 64.1 | 150 | 0 | 0 | --- | --- | 150 | 100.0 | 100.0 |
| Arkansas | 224 | 164 | 73.2 | --- | --- | 60 | 26.7 | 73.2 | 150 | 0 | 0 | --- | --- | 150 | 100.0 | 100.0 |
| California [1] | 223 | 185 | 83.0 | --- | --- | 38 | 17.0 | 83.0 | 150 | 2 | 1.3 | --- | --- | 148 | 98.7 | 98.7 |
| Connecticut | 224 | 167 | 74.6 | --- | --- | 57 | 25.4 | 74.6 | 149 | 2 | 1.3 | --- | --- | 147 | 98.7 | 98.7 |
| Delaware [1] | 220 | 160 | 72.7 | --- | --- | 60 | 27.3 | 72.7 | 147 | 1 | .7 | --- | --- | 146 | 99.3 | 99.3 |
| Florida | 222 | 182 | 82.0 | --- | --- | 40 | 18.0 | 82.0 | 149 | 0 | 0 | --- | --- | 149 | 100.0 | 100.0 |
| Georgia | 223 | 179 | 80.3 | --- | --- | 44 | 19.7 | 80.3 | 150 | 0 | 0 | --- | --- | 150 | 100.0 | 100.0 |
| Idaho [1] | 180 | 150 | 83.3 | --- | --- | 30 | 16.7 | 83.3 | 132 | 1 | .7 | --- | --- | 131 | 99.3 | 99.3 |
| Iowa | 223 | 187 | 83.9 | --- | --- | 36 | 16.1 | 83.9 | 150 | 0 | 0 | --- | --- | 150 | 100.0 | 100.0 |
| Kansas | 223 | 173 | 77.6 | --- | --- | 50 | 22.4 | 77.6 | 150 | 0 | 0 | --- | --- | 150 | 100.0 | 100.0 |
| Louisiana [1] | 221 | 178 | 80.5 | --- | --- | 43 | 19.5 | 80.5 | 147 | 0 | 0 | --- | --- | 147 | 100.0 | 100.0 |
| Maine [1] | 224 | 162 | 72.3 | --- | --- | 62 | 27.7 | 72.3 | 150 | 1 | .7 | --- | --- | 149 | 99.3 | 99.3 |
| Maryland [1] | 185 | 151 | 81.6 | --- | --- | 34 | 18.4 | 81.6 | 119 | 0 | 0 | --- | --- | 119 | 100.0 | 100.0 |
| Massachusetts | 211 | 144 | 68.2 | --- | --- | 67 | 31.8 | 68.2 | 149 | 1 | .7 | --- | --- | 148 | 99.3 | 99.3 |
| Minnesota | 160 | 134 | 83.8 | --- | --- | 26 | 16.2 | 83.8 | 142 | 0 | 0 | --- | --- | 142 | 100.0 | 100.0 |
| Mississippi | 224 | 174 | 77.7 | --- | --- | 50 | 22.3 | 77.7 | 150 | 0 | 0 | --- | --- | 150 | 100.0 | 100.0 |
| Missouri [1] | 223 | 176 | 78.9 | --- | --- | 47 | 21.1 | 78.9 | 150 | 0 | 0 | --- | --- | 150 | 100.0 | 100.0 |
| Montana | 218 | 172 | 78.9 | --- | --- | 46 | 21.1 | 78.9 | 146 | 1 | .7 | --- | --- | 145 | 99.3 | 99.3 |
| Nevada | 204 | 160 | 78.4 | --- | --- | 44 | 21.6 | 78.4 | 146 | 1 | .7 | --- | --- | 145 | 99.3 | 99.3 |
| New Jersey | 224 | 174 | 77.7 | --- | --- | 50 | 22.3 | 77.7 | 150 | 0 | 0 | --- | --- | 150 | 100.0 | 100.0 |
| New Mexico | 224 | 170 | 75.9 | --- | --- | 54 | 24.1 | 75.9 | 150 | 0 | 0 | --- | --- | 150 | 100.0 | 100.0 |
| New York | 224 | 158 | 70.5 | --- | --- | 66 | 29.5 | 70.5 | 150 | 0 | 0 | --- | --- | 150 | 100.0 | 100.0 |
| North Carolina | 221 | 179 | 81.0 | --- | --- | 42 | 19.0 | 81.0 | 150 | 0 | 0 | --- | --- | 150 | 100.0 | 100.0 |
| North Dakota [1] | 179 | 135 | 75.4 | --- | --- | 44 | 24.6 | 75.4 | 142 | 1 | .7 | --- | --- | 141 | 99.3 | 99.3 |
| Ohio | 223 | 175 | 78.5 | --- | --- | 48 | 21.5 | 78.5 | 149 | 0 | 0 | --- | --- | 149 | 100.0 | 100.0 |
| Oklahoma [1] | 222 | 193 | 86.9 | --- | --- | 29 | 13.0 | 86.9 | 149 | 0 | 0 | --- | --- | 149 | 100.0 | 100.0 |
| Oregon | 223 | 167 | 74.9 | --- | --- | 56 | 25.1 | 74.9 | 150 | 0 | 0 | --- | --- | 150 | 100.0 | 100.0 |
| Pennsylvania | 224 | 177 | 79.0 | --- | --- | 47 | 21.0 | 79.0 | 150 | 0 | 0 | --- | --- | 150 | 100.0 | 100.0 |
| South Carolina | 224 | 186 | 83.0 | --- | --- | 38 | 17.0 | 83.0 | 150 | 6 | 4.0 | --- | --- | 144 | 96.0 | 96.0 |
| South Dakota | 139 | 117 | 84.2 | --- | --- | 22 | 15.8 | 84.2 | 128 | 0 | 0 | --- | --- | 128 | 100.0 | 100.0 |
| Vermont [1] | 186 | 151 | 81.2 | --- | --- | 35 | 18.8 | 81.2 | 141 | 0 | 0 | --- | --- | 141 | 100.0 | 100.0 |
| Virginia [1] | 224 | 175 | 78.1 | --- | --- | 49 | 21.9 | 78.1 | 150 | 0 | 0 | --- | --- | 150 | 100.0 | 100.0 |
| West Virginia | 220 | 170 | 77.3 | --- | --- | 50 | 22.7 | 77.3 | 147 | 0 | 0 | --- | --- | 147 | 100.0 | 100.0 |
| Wyoming [1] | 72 | 64 | 88.9 | --- | --- | 8 | 11.1 | 88.9 | 84 | 0 | 0 | --- | --- | 84 | 100.0 | 100.0 |
| Hot Springs Medical Center | 204 | 154 | 75.5 | --- | --- | 50 | 24.5 | 75.5 | 145 | 0 | 0 | --- | --- | 145 | 100.0 | 100.0 |

See footnotes at end of table, p. 55.

## Results of Diagnostic Procedures in Evaluation of Serodiagnostic Methods, 1950—Continued

[Based upon results on serums from 224 known syphilitic donors and 150 presumably nonsyphilitic donors]

| Laboratory and test | Syphilitic group | | | | | | | | Nonsyphilitic group | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Serums tested | Positive | | Doubtful | | Negative | | Sensitivity | Serums tested | Positive | | Doubtful | | Negative | | Specificity |
| | | Number | Percent | Number | Percent | Number | Percent | | | Number | Percent | Number | Percent | Number | Percent | |
| Kline standard: | | | | | | | | | | | | | | | | |
| Control | 221 | 178 | 80.5 | 1 | 0.5 | 42 | 19.0 | 80.8 | 148 | 0 | 0 | 1 | 0.7 | 147 | 99.3 | 99.7 |
| Arizona | 223 | 154 | 69.1 | 24 | 10.8 | 45 | 20.1 | 74.4 | 150 | 0 | 0 | 0 | 0 | 150 | 100.0 | 100.0 |
| Georgia | 223 | 178 | 79.8 | 10 | 4.5 | 35 | 15.7 | 82.1 | 150 | 0 | 0 | 2 | 1.3 | 148 | 98.7 | 99.3 |
| Iowa | 224 | 181 | 80.8 | 10 | 4.5 | 33 | 14.7 | 83.0 | 150 | 0 | 0 | 0 | 0 | 150 | 100.0 | 100.0 |
| Kansas | 223 | 177 | 79.4 | 8 | 3.6 | 38 | 17.0 | 81.2 | 150 | 1 | .7 | 0 | 0 | 149 | 99.3 | 99.3 |
| Minnesota | 160 | 125 | 78.1 | 13 | 8.1 | 22 | 13.8 | 82.2 | 142 | 0 | 0 | 1 | .7 | 141 | 99.3 | 99.6 |
| Mississippi | 191 | 130 | 68.1 | 11 | 5.8 | 50 | 26.2 | 70.9 | 145 | 0 | 0 | 0 | 0 | 145 | 100.0 | 100.0 |
| North Carolina | 224 | 187 | 83.5 | 8 | 3.6 | 29 | 12.9 | 85.3 | 150 | 0 | 0 | 3 | 2.0 | 147 | 98.0 | 99.0 |
| Ohio | 223 | 176 | 78.9 | 14 | 6.3 | 33 | 14.8 | 82.1 | 149 | 0 | 0 | 0 | 0 | 149 | 100.0 | 100.0 |
| Oregon | 223 | 166 | 74.4 | 4 | 1.8 | 53 | 23.8 | 75.3 | 150 | 0 | 0 | 0 | 0 | 150 | 100.0 | 100.0 |
| Virginia [1] | 224 | 168 | 75.0 | 16 | 7.1 | 40 | 17.9 | 78.6 | 150 | 0 | 0 | 0 | 0 | 150 | 100.0 | 100.0 |
| VD Research Laboratory | 221 | 167 | 75.6 | 14 | 6.3 | 40 | 18.1 | 78.7 | 150 | 0 | 0 | 1 | .7 | 149 | 99.3 | 99.7 |
| Kline diagnostic test: | | | | | | | | | | | | | | | | |
| Control | 221 | 156 | 70.6 | 10 | 4.5 | 55 | 24.9 | 72.9 | 148 | 0 | 0 | 0 | 0 | 148 | 100.0 | 100.0 |
| Arkansas | 224 | 165 | 73.7 | 3 | 1.3 | 56 | 25.0 | 74.3 | 150 | 0 | 0 | 0 | 0 | 150 | 100.0 | 100.0 |
| Pennsylvania | 224 | 178 | 79.5 | 6 | 2.7 | 40 | 17.9 | 80.8 | 150 | 0 | 0 | 0 | 0 | 150 | 100.0 | 100.0 |
| Mazzini flocculation test: | | | | | | | | | | | | | | | | |
| Control | 222 | 160 | 72.1 | 27 | 12,2 | 35 | 15.8 | 78.2 | 149 | 0 | 0 | 0 | 0 | 149 | 100.0 | 100.0 |
| Connecticut | 217 | 155 | 71.4 | 16 | 7.4 | 46 | 21.2 | 75.1 | 148 | 0 | 0 | 0 | 0 | 148 | 100.0 | 100.0 |
| Florida | 222 | 176 | 79.3 | 5 | 2.3 | 41 | 18.5 | 80.4 | 149 | 0 | 0 | 0 | 0 | 149 | 100.0 | 100.0 |
| Georgia | 223 | 167 | 74.9 | 23 | 10.3 | 33 | 14.8 | 80.0 | 150 | 0 | 0 | 1 | .7 | 149 | 99.3 | 99.7 |
| Indiana | 222 | 149 | 67.1 | 26 | 11.7 | 47 | 21.2 | 73.0 | 150 | 0 | 0 | 0 | 0 | 150 | 100.0 | 100.0 |
| Mississippi | 224 | 166 | 74.1 | 11 | 4.9 | 47 | 21.0 | 76.6 | 150 | 0 | 0 | 0 | 0 | 150 | 100.0 | 100.0 |
| Missouri | 224 | 160 | 71.4 | 16 | 7.1 | 48 | 21.4 | 75.0 | 150 | 0 | 0 | 0 | 0 | 150 | 100.0 | 100.0 |
| New Jersey | 224 | 164 | 73.2 | 16 | 7.1 | 44 | 19.6 | 76.8 | 150 | 0 | 0 | 0 | 0 | 150 | 100.0 | 100.0 |
| New Mexico | 223 | 168 | 75.3 | 10 | 4.5 | 45 | 20.2 | 77.6 | 150 | 1 | .7 | 6 | 4.0 | 143 | 95.3 | 97.3 |
| North Carolina | 224 | 173 | 77.2 | 24 | 10.7 | 27 | 12.1 | 82.6 | 150 | 0 | 0 | 23 | 15.3 | 127 | 84.7 | 92.3 |
| North Dakota | 221 | 149 | 67.4 | 14 | 6.3 | 58 | 26.2 | 70.6 | 149 | 0 | 0 | 1 | .7 | 148 | 99.3 | 99.7 |
| Ohio | 223 | 181 | 81.2 | 9 | 4.0 | 33 | 14.8 | 83.2 | 149 | 0 | 0 | 0 | 0 | 149 | 100.0 | 100.0 |
| Oklahoma | 222 | 166 | 74.8 | 25 | 11.3 | 31 | 14.0 | 80.4 | 149 | 0 | 0 | 1 | .7 | 148 | 99.3 | 99.7 |
| Vermont [1] | 180 | 135 | 75.0 | 16 | 8.9 | 29 | 16.1 | 79.4 | 137 | 0 | 0 | 0 | 0 | 137 | 100.0 | 100.0 |
| Virginia | 224 | 156 | 69.6 | 24 | 10.7 | 44 | 19.6 | 75.0 | 149 | 0 | 0 | 0 | 0 | 149 | 100.0 | 100.0 |
| West Virginia | 220 | 160 | 72.7 | 13 | 5.9 | 47 | 21.4 | 75.7 | 148 | 0 | 0 | 0 | 0 | 148 | 100.0 | 100.0 |
| VD Research Laboratory | 223 | 150 | 67.3 | 35 | 15.7 | 38 | 17.0 | 75.1 | 149 | 0 | 0 | 0 | 0 | 149 | 100.0 | 100.0 |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Miscellaneous flocculation tests: | | | | | | | | | | | | | | | |
| VDRL Tube: | | | | | | | | | | | | | | | |
| Control | 224 | 155 | 69.2 | --- | --- | 69 | 30.8 | 69.2 | 150 | 0 | 0 | --- | --- | 150 | 100.0 | 100.0 |
| Connecticut | 223 | 120 | 53.8 | --- | --- | 103 | 46.2 | 53.8 | 149 | 0 | 0 | --- | --- | 149 | 100.0 | 100.0 |
| District of Columbia | 222 | 167 | 75.2 | --- | --- | 55 | 24.8 | 74.9 | 135 | 0 | 0 | --- | --- | 135 | 100.0 | 100.0 |
| Nebraska | 196 | 147 | 75.0 | --- | --- | 49 | 25.0 | 75.0 | 149 | 0 | 0 | --- | --- | 149 | 100.0 | 100.0 |
| Tennessee [1] | 224 | 169 | 75.4 | --- | --- | 55 | 24.6 | 75.4 | 150 | 0 | 0 | --- | --- | 150 | 100.0 | 100.0 |
| Indiana mycolipin slide | 220 | 129 | 58.6 | 39 | 17.7 | 52 | 23.6 | 67.5 | 150 | 4 | 2.7 | 22 | 14.7 | 124 | 82.6 | 90.0 |
| Nebraska flocculation | 223 | 175 | 78.5 | 1 | .4 | 47 | 21.1 | 78.7 | 150 | 0 | 0 | 0 | 0 | 150 | 100.0 | 100.0 |
| Eagle microflocculation Vermont | 221 | 153 | 69.2 | 10 | 4.5 | 58 | 26.2 | 71.5 | 147 | 0 | 0 | 1 | .7 | 146 | 99.3 | 99.7 |
| Hinton rapid—Control | 223 | 182 | 81.6 | 4 | 1.8 | 37 | 16.6 | 82.5 | 150 | 0 | 0 | 1 | .7 | 149 | 99.3 | 99.7 |
| Hinton cardiolipin—Control | 223 | 180 | 80.7 | 4 | 1.8 | 39 | 17.5 | 81.6 | 150 | 0 | 0 | 1 | .7 | 149 | 99.3 | 99.7 |
| Kahn cardiolipin—Control | 212 | 146 | 68.9 | 13 | 6.1 | 53 | 25.0 | 71.9 | 149 | 0 | 0 | 0 | 0 | 149 | 100.0 | 100.0 |
| Mazzini cardiolipin—Control | 222 | 174 | 78.4 | 17 | 7.7 | 31 | 14.0 | 82.2 | 149 | 0 | 0 | 0 | 0 | 149 | 100.0 | 100.0 |
| ***Supersensitive Tests*** | | | | | | | | | | | | | | | |
| Kahn presumptive precipitation test: | | | | | | | | | | | | | | | |
| Control | 224 | 176 | 78.6 | 2 | .9 | 46 | 20.5 | 79.0 | 150 | 1 | .7 | 1 | .7 | 148 | 98.7 | 99.0 |
| Colorado | 217 | 168 | 77.4 | 4 | 1.8 | 45 | 20.7 | 78.3 | 118 | 1 | .8 | 1 | .8 | 116 | 98.3 | 98.7 |
| Georgia | 224 | 171 | 76.3 | 3 | 1.3 | 50 | 22.3 | 77.0 | 150 | 0 | 0 | 1 | .7 | 149 | 99.3 | 99.7 |
| Michigan | 224 | 174 | 77.7 | 7 | 3.1 | 43 | 19.2 | 79.2 | 150 | 1 | .7 | 0 | 0 | 149 | 99.3 | 99.3 |
| South Dakota | 147 | 128 | 87.1 | 0 | 0 | 19 | 12.9 | 87.1 | 137 | 4 | 2.9 | 0 | 0 | 133 | 97.1 | 97.1 |
| VD Research Laboratory | 222 | 152 | 68.5 | 21 | 9.5 | 49 | 22.1 | 73.2 | 150 | 0 | 0 | 2 | 1.3 | 148 | 98.7 | 99.3 |
| Kline exclusion test: | | | | | | | | | | | | | | | |
| Control | 221 | 174 | 78.7 | 5 | 2.3 | 42 | 19.0 | 79.9 | 148 | 0 | 0 | 0 | 0 | 148 | 100.0 | 100.0 |
| California | 223 | 178 | 79.8 | 11 | 4.9 | 34 | 15.2 | 82.3 | 150 | 1 | .7 | 10 | 6.7 | 139 | 92.6 | 96.0 |
| Texas | 222 | 178 | 80.2 | 0 | 0 | 44 | 19.8 | 80.2 | 150 | 1 | .7 | 0 | 0 | 149 | 99.3 | 99.3 |
| New York microprecipitation test | 224 | 172 | 76.8 | 19 | 8.5 | 33 | 14.7 | 81.0 | 150 | 0 | 0 | 5 | 3.3 | 145 | 96.7 | 98.3 |
| Wisconsin W. P. I. complement-fixation | 224 | 183 | 81.7 | 3 | 1.3 | 38 | 17.0 | 82.4 | 149 | 0 | 0 | 0 | 0 | 149 | 100.0 | 100.0 |
| Eagle complement-fixation test: | | | | | | | | | | | | | | | |
| Control | 221 | 126 | 57.0 | 21 | 9.5 | 74 | 33.5 | 61.8 | 150 | 0 | 0.0 | 1 | 0.7 | 149 | 99.3 | 99.7 |
| District of Columbia | 218 | 129 | 59.2 | 1 | 0.5 | 88 | 40.4 | 59.4 | 149 | 0 | 0 | 0 | 0 | 149 | 100.0 | 100.0 |
| Maryland | 180 | 107 | 59.4 | 1 | 0.6 | 72 | 40.0 | 59.7 | 103 | 0 | 0 | 0 | 0 | 103 | 100.0 | 100.0 |
| Mississippi | 223 | 113 | 50.7 | 14 | 6.3 | 96 | 43.0 | 53.8 | 150 | 1 | .7 | 0 | 0 | 149 | 99.3 | 99.3 |
| North Carolina | 224 | 156 | 69.6 | 20 | 8.9 | 48 | 21.4 | 74.1 | 150 | 2 | 1.3 | 1 | .7 | 147 | 98.0 | 98.3 |
| Kolmer simplified complement-fixation test: | | | | | | | | | | | | | | | |
| Control | 224 | 175 | 78.1 | 0 | 0.0 | 49 | 21.9 | 78.1 | 150 | 0 | 0 | 0 | 0 | 150 | 100.0 | 100.0 |

See footnotes at end of table, p. 55.

## Results of Diagnostic Procedures in Evaluation of Serodiagnostic Methods, 1950—Continued

[Based upon results on serums from 224 known syphilitic donors and 150 presumably nonsyphilitic donors]

| Laboratory and test | Syphilitic group | | | | | | | | Nonsyphilitic group | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Serums tested | Positive | | Doubtful | | Negative | | Sensitivity | Serums tested | Positive | | Doubtful | | Negative | | Specificity |
| | | Number | Percent | Number | Percent | Number | Percent | | | Number | Percent | Number | Percent | Number | Percent | |
| ***Supersensitive Tests*—Continued** | | | | | | | | | | | | | | | | |
| Kolmer simplified complement fixation test—Continued: | | | | | | | | | | | | | | | | |
| Arkansas | 223 | 124 | 55.6 | 4 | 1.8 | 95 | 42.6 | 56.5 | 149 | 1 | 0.7 | 0 | 0 | 148 | 99.3 | 99.3 |
| California | 224 | 161 | 71.9 | 3 | 1.3 | 60 | 26.8 | 72.5 | 149 | 5 | 3.3 | 0 | 0 | 144 | 96.7 | 96.7 |
| Delaware | 222 | 156 | 70.3 | 5 | 2.3 | 61 | 27.5 | 71.4 | 150 | 0 | 0 | 0 | 0 | 150 | 100.0 | 100.0 |
| Georgia | 215 | 149 | 69.3 | 10 | 4.7 | 56 | 26.0 | 71.6 | 149 | 2 | 1.3 | 0 | 0 | 147 | 98.7 | 98.7 |
| Idaho | 216 | 163 | 75.5 | 1 | 0.5 | 52 | 24.1 | 75.7 | 148 | 0 | 0 | 0 | 0 | 148 | 100.0 | 100.0 |
| Indiana | 221 | 156 | 70.6 | 2 | 0.9 | 63 | 28.5 | 71.0 | 150 | 1 | .7 | 0 | 0 | 149 | 99.3 | 99.3 |
| Iowa | 223 | 165 | 74.0 | 8 | 3.6 | 50 | 22.4 | 75.8 | 150 | 0 | 0 | 0 | 0 | 150 | 100.0 | 100.0 |
| Kansas | 223 | 155 | 69.5 | 10 | 4.5 | 58 | 26.0 | 71.7 | 149 | 1 | .7 | 0 | 0 | 148 | 99.3 | 99.3 |
| Kentucky | 198 | 93 | 47.0 | 15 | 7.6 | 90 | 45.5 | 50.8 | 148 | 0 | 0 | 0 | 0 | 148 | 100.0 | 100.0 |
| Louisiana | 213 | 172 | 80.8 | 0 | 0.0 | 41 | 19.2 | 80.8 | 145 | 0 | 0 | 0 | 0 | 145 | 100.0 | 100.0 |
| Maine | 199 | 147 | 73.9 | 3 | 1.5 | 49 | 24.6 | 74.6 | 135 | 2 | 1.5 | 0 | 0 | 133 | 98.5 | 98.5 |
| Minnesota | 159 | 106 | 66.7 | 2 | 1.3 | 51 | 32.1 | 67.3 | 142 | 1 | .7 | 0 | 0 | 141 | 99.3 | 99.3 |
| Missouri | 219 | 153 | 69.9 | 9 | 4.1 | 57 | 26.0 | 71.9 | 149 | 1 | .7 | 0 | 0 | 148 | 99.3 | 99.3 |
| Montana | 214 | 154 | 72.0 | 7 | 3.3 | 53 | 24.8 | 73.6 | 146 | 1 | .7 | 4 | 2.7 | 141 | 96.6 | 97.9 |
| Nevada | 222 | 155 | 69.8 | 6 | 2.7 | 61 | 27.5 | 71.2 | 149 | 2 | 1.3 | 0 | 0 | 147 | 98.7 | 98.7 |
| New Jersey | 216 | 142 | 65.7 | 13 | 6.0 | 61 | 28.2 | 68.8 | 149 | 0 | 0 | 0 | 0 | 149 | 100.0 | 100.0 |
| New Mexico [1] | 198 | 106 | 53.5 | 4 | 2.0 | 88 | 44.4 | 54.5 | 149 | 0 | 0 | 0 | 0 | 149 | 100.0 | 100.0 |
| North Dakota | 212 | 130 | 61.3 | 11 | 5.2 | 71 | 33.5 | 63.9 | 148 | 1 | .7 | 0 | 0 | 147 | 99.3 | 99.3 |
| Ohio | 223 | 171 | 76.7 | 4 | 1.8 | 48 | 21.5 | 77.6 | 149 | 0 | 0 | 0 | 0 | 149 | 100.0 | 100.0 |
| Oklahoma | 223 | 164 | 73.5 | 6 | 2.7 | 51 | 22.9 | 74.9 | 147 | 1 | .7 | 0 | 0 | 146 | 99.3 | 99.3 |
| Oregon | 216 | 153 | 70.8 | 1 | 0.5 | 62 | 28.7 | 71.1 | 149 | 0 | 0 | 0 | 0 | 149 | 100.0 | 100.0 |
| Pennsylvania | 223 | 172 | 77.1 | 6 | 2.7 | 45 | 20.2 | 78.5 | 149 | 2 | 1.3 | 0 | 0 | 147 | 98.7 | 98.7 |
| Rhode Island | 215 | 147 | 68.4 | 8 | 3.7 | 60 | 27.9 | 70.2 | 148 | 1 | .7 | 0 | 0 | 147 | 99.3 | 99.3 |
| South Dakota | 143 | 96 | 67.1 | 7 | 4.9 | 40 | 28.0 | 69.6 | 140 | 1 | .7 | 0 | 0 | 139 | 99.3 | 99.3 |
| Tennessee | 220 | 149 | 67.7 | 1 | 0.5 | 70 | 31.8 | 68.0 | 150 | 0 | 0 | 0 | 0 | 150 | 100.0 | 100.0 |
| Texas | 218 | 165 | 75.7 | 1 | 0.5 | 52 | 23.9 | 75.9 | 148 | 0 | 0 | 0 | 0 | 148 | 100.0 | 100.0 |
| Vermont | 205 | 141 | 68.8 | 5 | 2.4 | 59 | 28.8 | 70.0 | 141 | 1 | .7 | 0 | 0 | 140 | 99.3 | 99.3 |
| Virginia | 224 | 162 | 72.3 | 5 | 2.2 | 57 | 25.4 | 73.4 | 149 | 0 | 0 | 0 | 0 | 149 | 100.0 | 100.0 |
| Washington | 207 | 134 | 64.7 | 6 | 2.9 | 67 | 32.4 | 66.2 | 147 | 0 | 0 | 0 | 0 | 147 | 100.0 | 100.0 |
| West Virginia | 196 | 157 | 80.1 | 1 | 0.5 | 38 | 19.4 | 80.4 | 120 | 0 | 0 | 0 | 0 | 120 | 100.0 | 100.0 |
| Hot Springs Medical Center | 201 | 137 | 68.2 | 7 | 3.5 | 57 | 28.4 | 69.9 | 145 | 1 | .7 | 0 | 0 | 144 | 99.3 | 99.3 |
| VD Research Laboratory | 219 | 155 | 70.8 | 5 | 2.3 | 59 | 26.9 | 71.9 | 149 | 1 | .7 | 0 | 0 | 148 | 99.3 | 99.3 |

| ***Other Complement-Fixation Tests*** | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kolmer cardiolipin | | | | | | | | | | | | | | | | |
| California [1] | 224 | 175 | 78.1 | 3 | 1.3 | 46 | 20.5 | 78.8 | 149 | 4 | 2.7 | 0 | 0 | 145 | 97.3 | 97.3 |
| Tennessee | 221 | 170 | 76.9 | 0 | 0.0 | 51 | 23.1 | 76.9 | 150 | 0 | 0 | 0 | 0 | 150 | 100.0 | 100 0 |
| VD Research Laboratory | 219 | 167 | 76.3 | 3 | 1.4 | 49 | 22.4 | 76.9 | 148 | 0 | 0 | 2 | 1.4 | 146 | 98.6 | 99.3 |
| Virginia [1] | 224 | 177 | 79.0 | 2 | 0.9 | 45 | 20.1 | 79.5 | 149 | 1 | .7 | 0 | 0 | 148 | 99.3 | 99.3 |
| Connecticut complement-fixation | 213 | 131 | 61.5 | 0 | 0.0 | 82 | 38.5 | 61.5 | 146 | 0 | 0 | 0 | 0 | 146 | 100.0 | 100.0 |
| Indiana mycolipin complement-fixation | 218 | 128 | 58.7 | 33 | 15.1 | 57 | 26.1 | 66.3 | 149 | 2 | 1.3 | 6 | 4.0 | 141 | 94.6 | 96.7 |
| Michigan complement-fixation | 218 | 124 | 56.9 | 17 | 7.8 | 77 | 35.3 | 60.8 | 148 | 0 | 0 | 0 | 0 | 148 | 100.0 | 100.0 |
| Nebraska complement-fixation | 222 | 174 | 78.4 | 0 | 0.0 | 48 | 21.6 | 78.4 | 150 | 0 | 0 | 0 | 0 | 150 | 100.0 | 100.0 |
| South Carolina complement-fixation | 221 | 153 | 69.2 | 17 | 7.7 | 51 | 23.1 | 73.1 | 150 | 0 | 0 | 1 | .7 | 149 | 99.3 | 99.7 |

Controls:
Eagle tests performed in the Venereal Disease Research Laboratory.
Hinton tests performed in the laboratory of Dr. William A. Hinton, Boston, Mass.
Kahn tests performed in the laboratory of Dr. Reuben L. Kahn, Ann Arbor, Mich.
Kline tests performed in the laboratory of Dr. Benjamin S. Kline, Cleveland, Ohio.
Kolmer tests performed in the laboratory of Dr. John A. Kolmer, Philadelphia, Pa.
Mazzini tests performed in the laboratory of Mr. L. Y. Mazzini, Indianapolis, Ind.
VDRL tests performed in the Venereal Disease Research Laboratory.

[1] Test results submitted on an experimental basis.

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PUBLIC HEALTH SERVICE

### Submission of Manuscripts

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# The Effect of Syphilis on Nonwhite Longevity as Reflected in Mortality Data, Georgia, 1939–41[1]

**Harry W. Martin** [2]

The purpose of this paper is to show the extent to which syphilis, as a reported cause of death during 1939–41, curtailed life expectancy among nonwhites[3] in the State of Georgia.

No study known to this investigator has been reported showing the effect of syphilis upon the expectation of life for a general population. However, by grouping deaths occurring from the infectious and parasitic diseases in the colored population in the United States (1939–41), life expectancy was found to be reduced by 4.53 years among males and 4.12 years among females. This group included, among others, syphilis, scarlet fever, whooping cough, diphtheria, tuberculosis, dysentery, malaria, influenza, and measles (*1*). There are, however, several studies of observed syphilitic populations which indicate the effects of the disease upon the average future lifetime of infected individuals.

Usilton and Miner (*2*) reported a study made in 1937 from data on 1,055 colored males 30 years of age and over. This study showed colored males with syphilis to have a life expectancy of 7.8 years less than the general population of colored males—a reduction of life expectancy, at age 30, of about 25 percent. Heller and P. T. Bruyere (*3*) reported that untreated syphilis among male Negroes between the ages of 25 and 50 in a rural Alabama area reduced the expectation of life by 20 percent as compared with that of uninfected Negro males in the same area.

Smith and M. C. Bruyere (*4*) made an investigation on the effects of treated acquired syphilis on life expectancy in 11 Virginia counties. A comparison of life expectancies derived from mortality rates among persons under treatment for acquired syphilis was made with those of the general population in the same area. Life expectancies of persons with syphilis were consistently lower than those of the general population from age 15 through 74. Negro males in the age group 15–19 with treated acquired syphilis had their average future lifetime curtailed by about 10 percent, and Negro females by approximately 7 percent.

Two types of life tables have been employed in the present study. The first type is called "regular" life tables to denote those tables which are based upon mortality rates resulting from all causes of death in the Georgia nonwhite population for 1939–41. The second type is designated "special" to indicate those life tables in which syphilis, as a reported cause of death, has been eliminated.

The regular life tables were computed by the method developed by Reed and Merrell (*5*) for constructing an abridged life table. The special tables were constructed by a method developed by Greville (*6*) for calculating a life table after a specific cause (or causes) of death has been eliminated.

A 3-year average (1939–41) for both total deaths and syphilis deaths was used in computing all life tables. Simple linear extrapolation was used to arrive at population estimates for the midpoint of the 3-year interval. Deaths of unknown ages were distributed pro rata over all age groups. No corrections of

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[1] Selected parts of this paper are based upon "An Analysis of Syphilis Mortality by Age, Sex, and Race, Georgia, 1938–1947" (unpublished Master's thesis, by Harry W. Martin, The University of Georgia, Athens, Ga., 1950).

[2] Instructor, Department of Sociology and Economics, Salem College, Winston-Salem, N. C.

[3] Includes with Negroes all other colored races which constitute less than 1 percent of the State's nonwhites.

Acknowledgment: The writer wishes to express appreciation to Dr. C. A. McMahan of the Department of Sociology, University of Georgia, for helpful suggestions in the preparation of this paper.

either census data or vital statistics data were attempted. This omission was based upon two reasons: (*a*) the Reed-Merrell method corrects for errors of underenumeration for ages under 5; and (*b*) it seemed unwise to attempt to correct for errors in death registrations and for misstatements of ages in the older age groups, as the magnitude of these errors is not known.

Certain comparisons of selected functions of the regular and special life tables for nonwhite males are made possible by the data shown in table 1. From this table it is seen that in every age through the age group 85–89 all values of the special life table are consistently above those of the regular table. Based on the 1939–41 mortality rate, the average future lifetime of the nonwhite male in Georgia, at birth, is shortened by 0.82 of a year through the presence of syphilis. This difference diminishes throughout life until the eighty-fifth year of life when it becomes negligible.

The effect of eliminating syphilis from the nonwhite female segment of the Georgia population is shown in table 2. The difference among the females follows the same pattern as that of the males except that the differential is less. At birth, the nonwhite female had her life expectancy curtailed by 0.56 of a year, which is gradually reduced to negligibility at about the eighty-fifth year of life.

Another interesting measure of the effects of syphilis upon a population is the "potential years of life lost." This measure is arrived at by multiplying the actual number of deaths occurring from the disease in each age group (for a

**Table 1.**—*Abridged life tables for nonwhite males, Georgia, 1939–41*

| Age interval $x$ to $x+n$ | Special life table |  |  | Regular life table |  |  | Difference in $e_x$ of special and regular tables |
|---|---|---|---|---|---|---|---|
|  | Number surviving to exact age $x$ out of 100,000 born alive | Mortality rate—number dying per 1,000 in interval $x$ to $x+n$ | Complete expectation of life, or mean after lifetime at age $x$ | Number surviving to exact ago $x$ out of 100,000 born alive | Mortality rate—number dying per 1,000 in interval $x$ to $x+n$ | Complete expectation of life, or mean after lifetime at age $x$ |  |
|  | $l_x$ | $1{,}000q_x$ | $\mathring{e}_x$ | $l_x$ | $1{,}000q_x$ | $\mathring{e}_x$ | (4)−(7) |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| 0-1 | 100,000 | 82.6 | 51.40 | 100,000 | 84.7 | 50.58 | 0.8 |
| 1-4 | 91.738 | 19.0 | 55.00 | 91,530 | 19.2 | 54.23 | .7 |
| 5-9 | 90,000 | 7.3 | 52.04 | 89,774 | 7.5 | 51.26 | .7 |
| 10-14 | 89,341 | 7.8 | 47.40 | 89,103 | 7.8 | 46.63 | .7 |
| 15-19 | 88,665 | 17.8 | 42.75 | 88,420 | 18.0 | 41.97 | .7 |
| 20-24 | 87,085 | 32.0 | 38.48 | 86,828 | 33.1 | 37.69 | .7 |
| 25-20 | 84,297 | 42.2 | 34.66 | 83,956 | 45.3 | 33.89 | .7 |
| 30-34 | 80,741 | 54.6 | 31.08 | 80,154 | 58.9 | 30.37 | .7 |
| 35-39 | 76,335 | 62.7 | 27.72 | 75,434 | 66.8 | 27.11 | .6 |
| 40-44 | 71,551 | 88.8 | 24.40 | 70,395 | 96.1 | 23.87 | .5 |
| 45-49 | 65,200 | 120.1 | 21.52 | 63,632 | 126.5 | 21.13 | .3 |
| 50-54 | 57,370 | 151.4 | 19.11 | 55,584 | 157.4 | 18.82 | .2 |
| 55-59 | 48,686 | 186.9 | 17.07 | 46,835 | 192.2 | 16.86 | .2 |
| 60-61 | 39,588 | 190.0 | 15.42 | 37,833 | 193.2 | 15.29 | .1 |
| 65-69 | 32.065 | 177.1 | 13.48 | 30,524 | 180.5 | 13.38 | .1 |
| 70-74 | 26,387 | 249.7 | 10.85 | 25,013 | 252.3 | 10.78 | .0 |
| 75-79 | 19,797 | 344.6 | 8 61 | 18,701 | 347.6 | 8.57 | .0 |
| 80-84 | 12,975 | 459.3 | 6.84 | 12,200 | 461.0 | 6.81 | .0 |
| 85-89 | 7,016 | 543.3 | 5.62 | 6,575 | 546.3 | 5.59 | .0 |
| 90-94 | 3,204 | 633.1 | 4.58 | 2,983 | 633.1 | 4.58 | ---------- |
| 95-99 | 1,175 | 659.0 | 3.71 | 1,094 | 659.0 | 3.71 | ---------- |
| 100 up | 401 | ---------- | ---------- | 373 | ---------- | ---------- | ---------- |

Source: Mortality data from Vital Statistics of the United States, 1939, part I; 1940, part II; and 1941, part I
Data on syphilis deaths from Vital Statistics of the United States, 1939, part I; 1940, part I; and 1941, part I
Population data from Sixteenth Census of the United States, 1940, vols. II and IV.

**Table 2.—*Abridged life tables for nonwhite females, Georgia, 1939–41***

| Age interval $x$ to $x+n$ | Special life table: Number surviving to exact age $x$ out of 100,000 born alive $l_x$ | Special life table: Mortality rate—number dying per 1,000 in interval $x$ to $x+n$ $1{,}000q_x$ | Special life table: Complete expectation of life, or mean after lifetime at age $x$ $\overset{\circ}{e}_x$ | Regular life table: Number surviving to exact age $x$ out of 100,000 born alive $l_x$ | Regular life table: Mortality rate—number dying per 1,000 in interval $x$ to $x+n$ $1{,}000q_x$ | Regular life table: Complete expectation of life, or mean after lifetime at age $x$ $\overset{\circ}{e}_x$ | Differences in $e_x$ of special and regular tables (4)−(7) |
|---|---|---|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| -1 | 100,000 | 63.0 | 55.75 | 100,000 | 64.7 | 55.19 | 0.56 |
| -4 | 93,696 | 16.3 | 58.48 | 93,534 | 16.6 | 57.99 | .49 |
| -9 | 92,171 | 5.4 | 55.43 | 91,980 | 5.6 | 54.95 | .48 |
| 0-14 | 91,671 | 6.1 | 50.72 | 91,466 | 6.3 | 50.24 | .48 |
| 5-19 | 91,109 | 19.3 | 46.00 | 90,892 | 20.1 | 45.54 | .46 |
| 0-24 | 89,355 | 27.1 | 41.85 | 89,064 | 28.4 | 41.42 | .43 |
| 5-29 | 86,930 | 35.6 | 37.94 | 86,533 | 37.0 | 37.56 | .38 |
| 0-34 | 83,832 | 45.9 | 34.25 | 83,331 | 48.1 | 33.90 | .35 |
| 5-39 | 79,982 | 53.8 | 30.78 | 79,323 | 55.8 | 30.48 | .30 |
| 0-44 | 75,682 | 79.9 | 27.38 | 74,896 | 82.3 | 27.13 | .25 |
| 5-49 | 69,636 | 89.5 | 24.53 | 68,731 | 92.1 | 24.33 | .20 |
| 0-54 | 63,401 | 125.4 | 21.69 | 62,401 | 128.1 | 21.54 | .15 |
| 5-59 | 55,449 | 164.8 | 19.43 | 54,407 | 166.8 | 19.33 | .10 |
| 0-64 | 46,313 | 170.8 | 17.77 | 45,330 | 172.3 | 17.70 | .07 |
| 5-69 | 38,401 | 152.7 | 15.94 | 37,518 | 154.1 | 15.89 | .05 |
| 0-74 | 32,538 | 210.6 | 13.37 | 31,738 | 211.2 | 13.33 | .04 |
| 5-79 | 25,685 | 244.9 | 11.27 | 25,035 | 245.9 | 11.23 | .04 |
| 0-84 | 19,396 | 311.2 | 9.12 | 18,879 | 313.0 | 9.08 | .04 |
| 5-89 | 13,360 | 427.8 | 7.11 | 12,970 | 430.7 | 7.09 | .02 |
| 0-94 | 7,644 | 542.5 | 5.61 | 7,384 | 542.5 | 5.61 | ---------- |
| 5-99 | 3,497 | 520.4 | 4.54 | 3,378 | 520.4 | 4.54 | ---------- |
| 00 up | 1,677 | ---------- | ---------- | 1,620 | ---------- | ---------- | ---------- |

Source: Mortality data from Vital Statistics of the United States, 1939, part I; 1940, part II; and 1941, part II. Data on syphilis deaths from Vital Statistics of the United States, 1939, part I; 1940, part I; and 1941, part II. Population data from Sixteenth Census of the United States, 1940, vols. II and IV.

given period of time) by the life expectancy value of each age group in the special table and summing. (It should be noted that this measure assumes that each individual dying from syphilis would have, had he not died from syphilis, lived out the remaining average future lifetime of his age group.) By this measure, nonwhite males in Georgia forfeited on an average per year, for the period 1939–41, approximately 8,000 potential years of life to syphilis. Of this amount, nearly 6,000 years were lost between the ages 15 and 64—usually the most productive years of life. Females lost about 6,000 potential years of life per year for the same period with slightly over 4,000 years of this being cut off between the ages 15 and 64.

These findings, for many reasons, are not thought to reflect the absolute or true picture of the effects of the disease upon the longevity of the nonwhites in the State. For example, because of errors in reporting deaths resulting from the disease, the vital statistics data are not entirely accurate. These errors are often induced by social taboos against the disease, absence of autopsies when cause of death is determined, and restrictions imposed by certain classes of insurance. Neither is a study of this type able to indicate increased mortality from other diseases (7) which possibly occur among syphilitics.

These factors undoubtedly tend to conceal the actual effects of the disease. In spite of these limitations, however, reported deaths from syphilis show that the disease plays an important part in reducing longevity of the general nonwhite population of Georgia.

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# Venereal Disease Case Finding in High-Prevalence Areas

## I. Procedures Used[1]

**Gustav Gumpert, A. B.;[2] Norman R. Ingraham, Jr., M. D.;[3] Michael J. Burke, M. A.**

Intensive campaigns for venereal disease case finding, like similar campaigns in other fields of public health education, traditionally have as their aim to stimulate people, particularly those who suspect they may be infected, to report for diagnostic examination. It is generally assumed that one of the ways to accomplish this is to acquaint people with the symptoms of the venereal diseases, thus raising this level of suspicion, and to inculcate in them a broad, generalized knowledge of the nature and dangers of these diseases.

Wright, Sheps, and Gifford (*1*) suggest that venereal disease education should motivate changes in individual behavior that will (*a*) alter sex habits, resulting in less promiscuity and/or the greater use of prophylaxis by individuals; and/or (*b*) bring infected individuals to treatment without delay. The last-named change in behavior was the primary goal of the program about to be described.

Unlike long-range educational programs, case-finding campaigns are generally measured and evaluated by their effect upon the immediate case yield. Their goal is not far from that of commercial advertising, which strives for a rapid and significant increase in sales. To be really effective, the case-finding method should stimulate more infected individuals to report for examination (at a lower cost per patient) than would be so stimulated by other successful modes of approach.

In the planning for the Philadelphia venereal disease campaign, held from June 15 to November 15, 1949, a considerable amount of precampaign time was devoted to the study and evaluation of existing educational case-finding methods. We believed that, like a good advertisement, a successful case-finding method should appeal to a specific audience. We clearly defined our primary audience as the 290,680 persons[5] living in the north-central and the south-central areas of Philadelphia, where the incidence and prevalence of the venereal diseases are known to be high. Secondarily, we tried

---

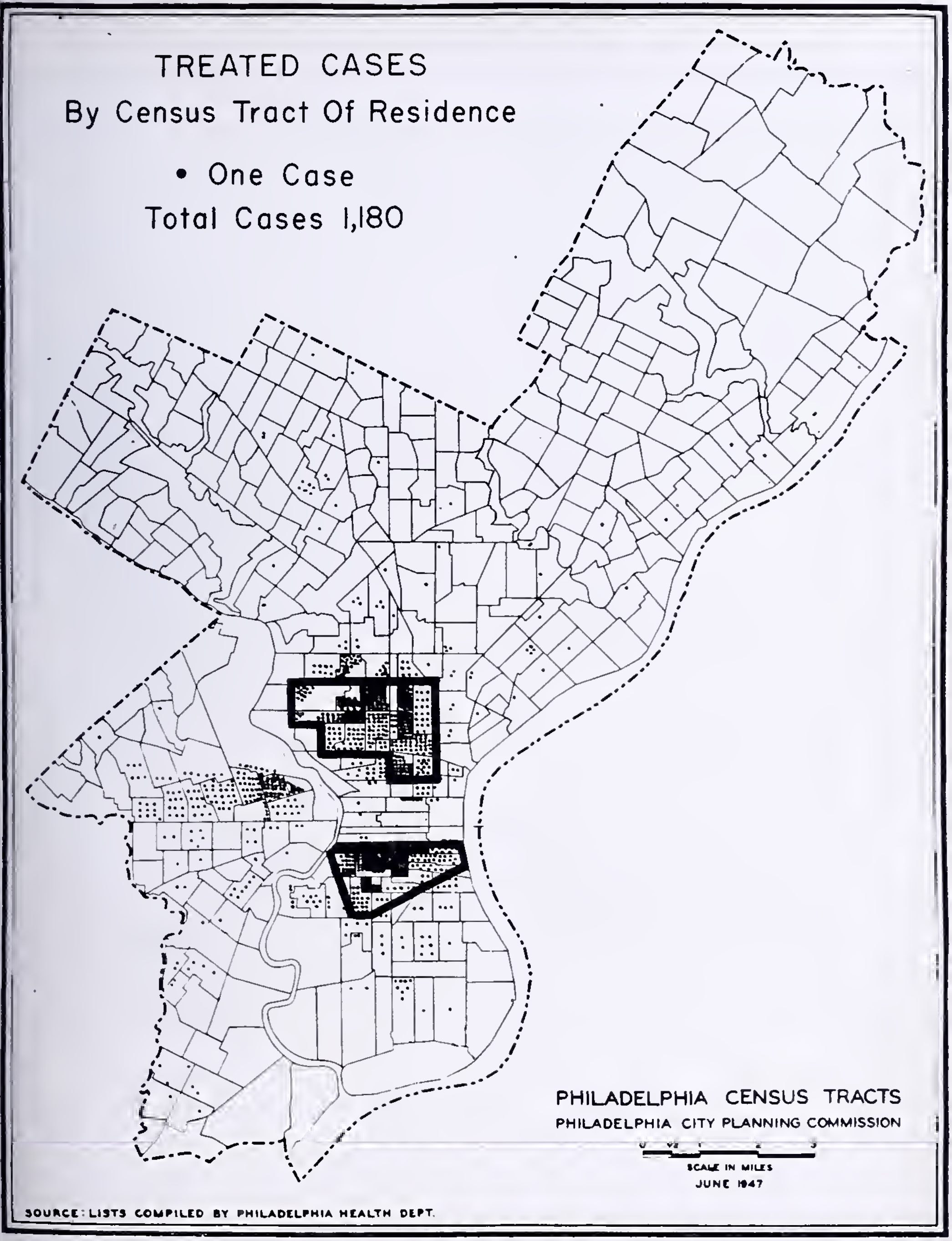
[1] From Division of Venereal Disease Control, Department of Public Health, Philadelphia (Rufus S. Reeves, M. D., Director).

[2] Education Director.

[3] Division Chief.

[4] Statistical Epidemiologist.

[5] Preliminary figures as of April 1, 1950, released by the U. S. Bureau of the Census, July 1950.


TREATED CASES
By Census Tract Of Residence
• One Case
Total Cases 1,180
PHILADELPHIA CENSUS TRACTS
PHILADELPHIA CITY PLANNING COMMISSION
0 1/2 1 2 3
SCALE IN MILES
JUNE 1947

SOURCE: LISTS COMPILED BY PHILADELPHIA HEALTH DEPT.

FIGURE 1.—Cases of venereal disease reported treated in Philadelphia, 1st quarter 1947. (Boxed areas indicate sections of high venereal disease prevalence and of high population density which were selected for major educational activity.)

to reach specific occupational and civic groups, as well as the general public.

We defined our primary audience on the basis of data contained in a sociologic study[6] made in 1947 that revealed a significant correlation between population density in Philadelphia and the prevalence of venereal infection. The physical boundaries of these two areas of high prevalence were rather sharply defined by a spot map (fig. 1) showing the incidence of infection in the first quarter of 1947. In order to ascertain the type of informational materials that might be most productive in these two areas, it was necessary to determine the socioeconomic characteristics of the people living there. Investigation showed that the two areas were populated principally by nonwhite persons having a poor economic and educational status. This implied that the material to be used should be written in simple language and should appeal more to emotion and human interest than to abstract health principles. The semiilliteracy of the people in these areas implied that oral and pictorial presentation might prove more valuable than written presentation.

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[6] Master's degree thesis by R. G. Burnight, "Urban Sociology and Ecology," University of Pennsylvania.

### Single Diagnostic Center

We decided to place our emphasis upon reporting to a single diagnostic center conveniently located about a block from the City Hall.

Our theory in using only one diagnostic center is perhaps worthy of comment. We believed, first, that directing patients to a specific clinic is psychologically more effective than vague appeals to the public to seek examination at nonspecified places. In addition, central records and files facilitate later statistical evaluation of our educational methods.

Except for the treatment of male patients having gonorrhea, no therapy was undertaken at the diagnostic center. After the medical examination, infected persons were referred for treatment either to private physicians of their own selection or to a public or private clinic near their homes. A physician, two full-time public health nurses, two social service investigators, a clerk, and a health education worker comprised the center's staff.

### Aid of Professional and Civic Groups

From the outset of the campaign we enlisted the cooperation and active aid of various groups. The Philadelphia County Medical Society was told of our objectives and was asked to approve the publicity methods to be used. Numerous community agencies having allied interests and activities endorsed the campaign. All of our publicity releases listed the principal sponsoring organizations, and other cooperating agencies were mentioned whenever possible.

Through the Committee on Venereal Disease of the Philadelphia County Medical Society a letter was prepared requesting cooperation in the coming campaign. It was acted upon by the Board of Directors, signed by the president, and sent to the more than 5,000 physicians of the city. Special notices and features appeared in "Philadelphia Medicine," their official weekly publication. In addition, much of our campaign literature was sent them from time to time as it was issued, accompanied by a mimeographed letter explaining its intended purpose and use.

### Publicity Methods

Having determined the two areas of high prevalence and the characteristics of their population and having secured the endorsement of the medical society and of public and private agencies, we next considered what publicity methods should be used. Because we expected the venereally infected people in these two areas to be apathetic to ordinary educational methods, more direct ones were needed. Much of the commercially available informational material seemed inadequate or inappropriate. What we needed was a saturation-type approach that would be seen or heard by the majority of persons living in the two areas and that would overcome this apathy.

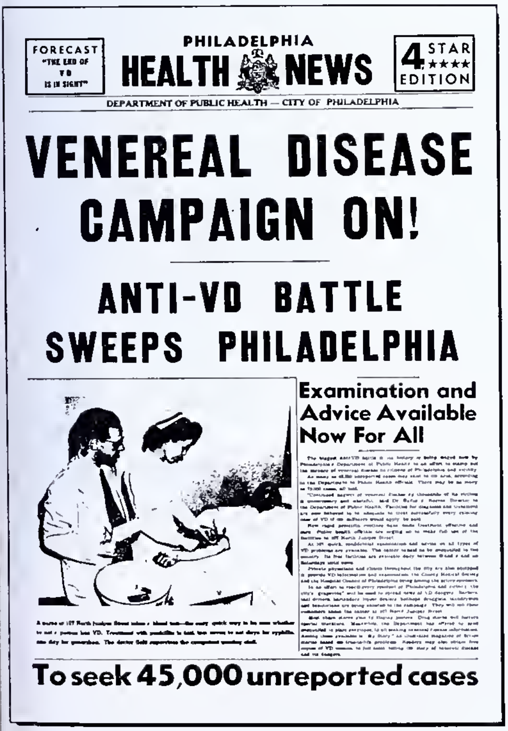
Four types of approach were possible: oral, written, audio-visual, and pictorial. Since we had no data on how the people in these two areas would respond, it seemed wise to use all four types. In any case, the material presented had to be simple and direct.

A campaign through newspapers, radio, and television was first considered. Newspapers, particularly those in the high-prevalence areas, willingly offered their cooperation without cost; but the question of literacy caused the planners to hesitate before placing major emphasis on this medium. The per capita ownership of radios in the two areas was known to be lower than the average for the entire urban area.

We finally decided to concentrate our efforts on three saturation-type approaches to the people in these two areas—a tabloid newspaper, car cards, and sound trucks.

### *Tabloid Newspaper*

Our most concentrated effort was the distribution of a tabloid newspaper (*Philadelphia Health News* (fig. 2)) prepared by our education staff. More than 72,500 copies of this one-issue newspaper, following closely the pattern of a standard tabloid, were distributed door-to-door in the two areas by a commercial agency. The paper contained news items and pictures about the Philadelphia campaign, as well as stories, letters, comics, cartoons, advertisements, and human-interest material. Theoretically, every dwelling unit in the two areas received at least one copy of this publication.


FORECAST
"THE END OF
VD
IS IN SIGHT"

PHILADELPHIA
HEALTH NEWS

4 STAR
★★★★
EDITION

DEPARTMENT OF PUBLIC HEALTH — CITY OF PHILADELPHIA

VENEREAL DISEASE
CAMPAIGN ON!

ANTI-VD BATTLE
SWEEPS PHILADELPHIA

Examination and
Advice Available
Now For All

To seek 45,000 unreported cases

FIGURE 2.—More than 72,500 copies of this one-issue newspaper were distributed.

### *Car Cards*

We decided to use car cards (fig. 3) after examining the results of a car-card survey in eight large cities, including Philadelphia. The survey[7] analyzed a sample of 93,118 rides in public vehicles. The results indicated that Philadelphia consistently rated highest in its use of public transportation and that 88 percent of the people in Philadelphia 5 years of age and over used public vehicles in which car cards were displayed during the 2-week survey. The sampling further indicated that the average person took from 20 to 40 rides a month. On the basis of these figures it seemed evident that poster-type car cards displayed in street cars and busses traveling through the two high-prevalence areas should reach most of the families there and should prove productive as a case-finding method.

Five different sets of car cards appeared regularly in one-fourth of the city's public vehicles—1,100 each month of the 5-month campaign. They were designed by a local artist who used the most modern commercial art methods. The cards dealt with the dangers, symptoms, and treatment of venereal disease. According to a postcampaign estimate made by the officials of the transit advertising company from whom space for the cards was purchased, about 420,000 persons saw the cards each day. They were estimated to have reached 1,295,000 persons throughout the city and 80 percent of the persons in the two areas.

### *Sound Trucks*

A sound truck (fig. 4) cruised each area 8 hours a day for 7 days. Each carried two large banners announcing the campaign and played a phonograph recording, "That Ignorant, Ignorant Cowboy,"[8] interrupted at 3-minute intervals by recorded spot announcements. The rental cost prohibited their more extensive use, but even so they are estimated to have

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[7] Unpublished data from the files of National Transitads, Inc.

[8] Communication Materials Center, Columbia University Press, New York, N. Y.

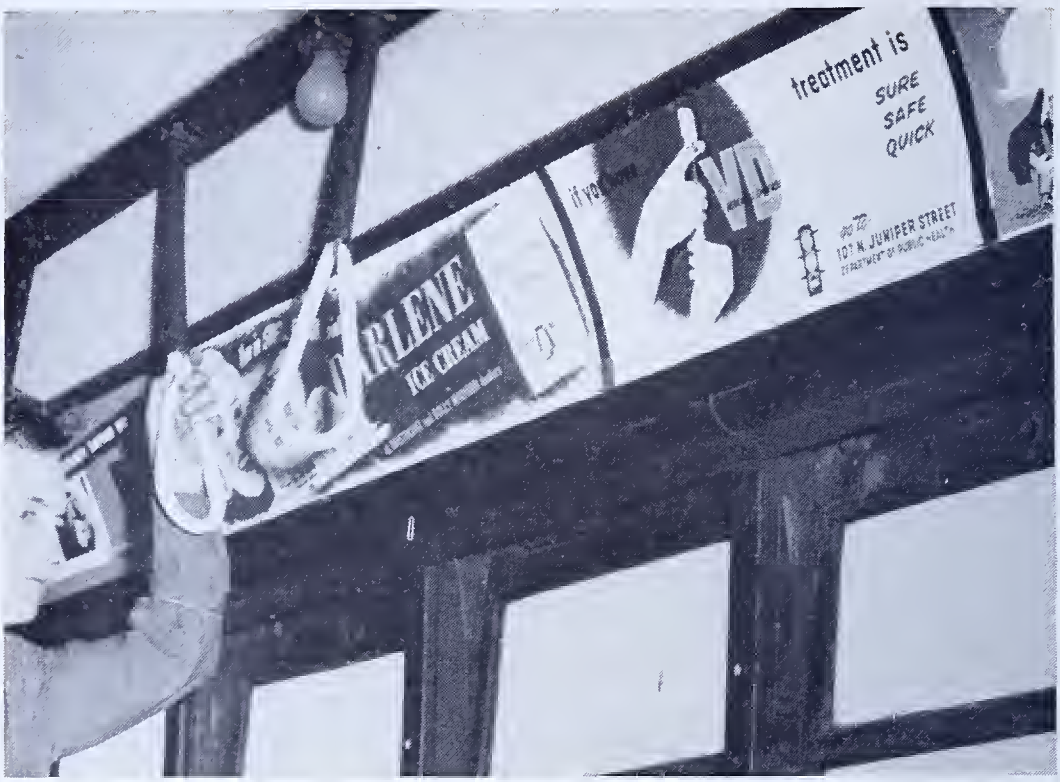


FIGURE 3.—Car cards were displayed in streetcars and busses traveling through the campaign areas.

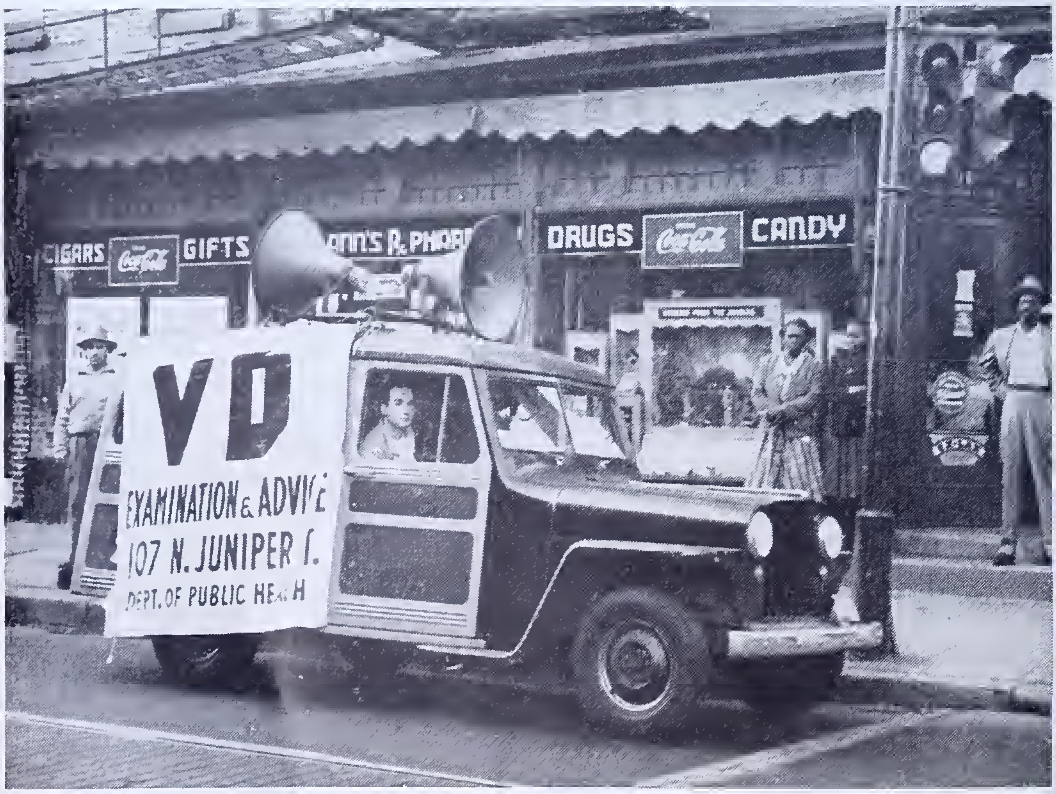


FIGURE 4.—Recorded songs and spot announcements were broadcast from sound trucks.

reached 50 percent of the persons in the two areas.

The thought underlying the application of these saturation technics was that each person in the high-prevalence areas ought to come in contact with information about the venereal diseases and the campaign as many times as possible. We believed this was assured by the use of the tabloid newspaper in combination with the car cards and the sound trucks. We had a direct estimate of the number of families in the two areas reached by the tabloid and the sound trucks. It was not known what percentage of the streetcar and bus riders lived in the areas of high prevalence. But, on the assumption that the people in the lower-income areas use public transportation more than those in the higher, it seemed safe to assume that a reasonably thorough coverage would be assured.

### *Other Methods Used*

In an effort to close the gaps that might have existed in the saturation methods, as well as to reach special groups and the general public, a wide variety of other educational approaches was employed. These were experimental in the sense that it was not known which would prove most effective. Indeed, the statistical material gathered as part of the campaign evaluation clearly demonstrates that some of the mediums expected to produce the best results produced the poorest, and vice versa.

While we placed major emphasis on educational projects in the two areas of high venereal disease prevalence, it was difficult to localize many of the methods. The door-to-door distribution of the tabloid newspaper was our most effective attempt to do this. The sound trucks, which were also confined to the two areas involved, were localized, but the number of persons reached by them was not easy to estimate. Although the car cards were displayed in streetcars and busses having their routes through the selected areas, these vehicles passed through other areas as well. All of our other methods "spilled" into the rest of the city.

*Newspaper Stories.*—We established a schedule of weekly publicity releases to 98 weekly and 3 daily newspapers. During the campaign period we sent 2,020 releases to these papers. The combined circulation of the papers using our stories was 1,904,597. Publicity releases were also issued when special campaign events were to be announced.

At the same time we distributed to the weekly papers 50 stereotype mats prepared by our education staff. These consisted of 1-column, 5-inch, simulated case histories written in popular style.

In addition, 500 newspaper mats, for which space was not purchased, were distributed, and an estimated 2,000 column inches were published.

In order to obtain data regarding the acceptance of our material by newspapers, the services of a clipping bureau were engaged. The returns indicated that about 60 percent of the case histories, for which space was not purchased, appeared in print, with a little more than 80 percent appearing in newspapers in which space was simultaneously being purchased for ads.

It was estimated that the community newspapers with circulation primarily in the areas of high venereal disease prevalence published 88 percent of the material we sent them during the first 4 months of the campaign. The city's four major Negro newspapers demonstrated the highest degree of cooperation, printing about 98 percent of the material.

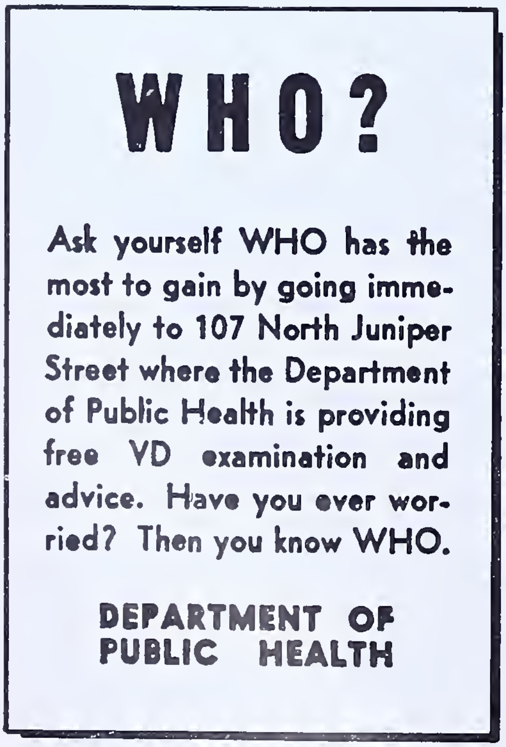
In areas known to have a low incidence of venereal disease the editorial cooperation was proportionately lower, and in areas of high economic and social stability there was little or no cooperation. The daily papers, on the other hand, cooperated well although, for space-saving reasons, the releases were generally condensed. During the first week of the campaign one daily paper used the phrase "social disease" for "venereal disease" but later accepted the more common term. All of the daily papers, however, were reluctant to publish photographs relating to the campaign.

*Newspaper Advertisements.*—We restricted our use of newspaper ads to displays not more than 1 column wide and 3 inches long except for one series appearing in the Negro papers that averaged about 5 inches in depth. The first to appear, at the midpoint of the campaign, were three identical ads in the daily papers announcing a radio drama on venereal disease.

The second series of paid ads appeared in the four major Negro papers, beginning in October and running until the end of the campaign. In each paper we used 10 illustrated, tabloid-style mats describing the symptoms and effects of syphilis and gonorrhea.

Later we ran a series of 5 ads in 3 daily papers and a series of 6 ads in 22 weekly community newspapers. They consisted of boldface displays of the words "Who?" "When?" "What?" "Where?" and "Why?" Brief copy related these words to the facilities being offered by the Department of Public Health (fig. 5).

In all, 190 paid ads were used, comprising 650 newspaper column inches.



WHO?

Ask yourself WHO has the most to gain by going immediately to 107 North Juniper Street where the Department of Public Health is providing free VD examination and advice. Have you ever worried? Then you know WHO.

DEPARTMENT OF
PUBLIC HEALTH

FIGURE 5.—Paid ads appeared in daily and weekly newspapers.

A local newspaper association serving the two areas estimated that approximately 20 percent of the persons in the two areas were reached by newspaper articles and advertisements combined.

*Blimp.*—One of the more spectacular devices we used was a 253-foot blimp carrying 27-foot illuminated letters (fig. 6). For seven evenings, from 7 until 11 p. m., the blimp crossed and recrossed the city and its environs and paid special trips to key gathering places where thousands of persons could see it and read its message. Based on impartial polls and survey information it was estimated that 1,380,000 persons saw the blimp and that it reached 50 percent of the persons in the two high-prevalence areas.

*Radio and Television.*—Each Friday we sent 10 spot announcements to the 16 local radio stations—a total of 3,200 announcements. The stations were consistently cooperative. In addition to presenting our spot announcements of 100 words or less each day, many of them used the 20 different 15-minute transcriptions[8] we sent. The majority of the transcriptions were dramas featuring prominent stars of radio, stage, and screen in stories concerning the dangers of venereal disease.

On the basis of data supplied by the Philadelphia Association for Education by Radio, we estimated that less than 10 percent of the persons in the two areas would be reached by this medium.

The education staff was unable to present our campaign material on local television outlets. Their program representatives decided after rather extensive consultation that it was not considered "suitable."

*Juke Boxes.*—Copies of the phonograph record "That Ignorant, Ignorant Cowboy" were sent to the major Philadelphia companies that control the city's jukebox outlets. The immediate reaction was favorable, and requests were soon received for the records. In all, 130 records

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[8] Communication Materials Center, Columbia University Press, New York, N. Y.

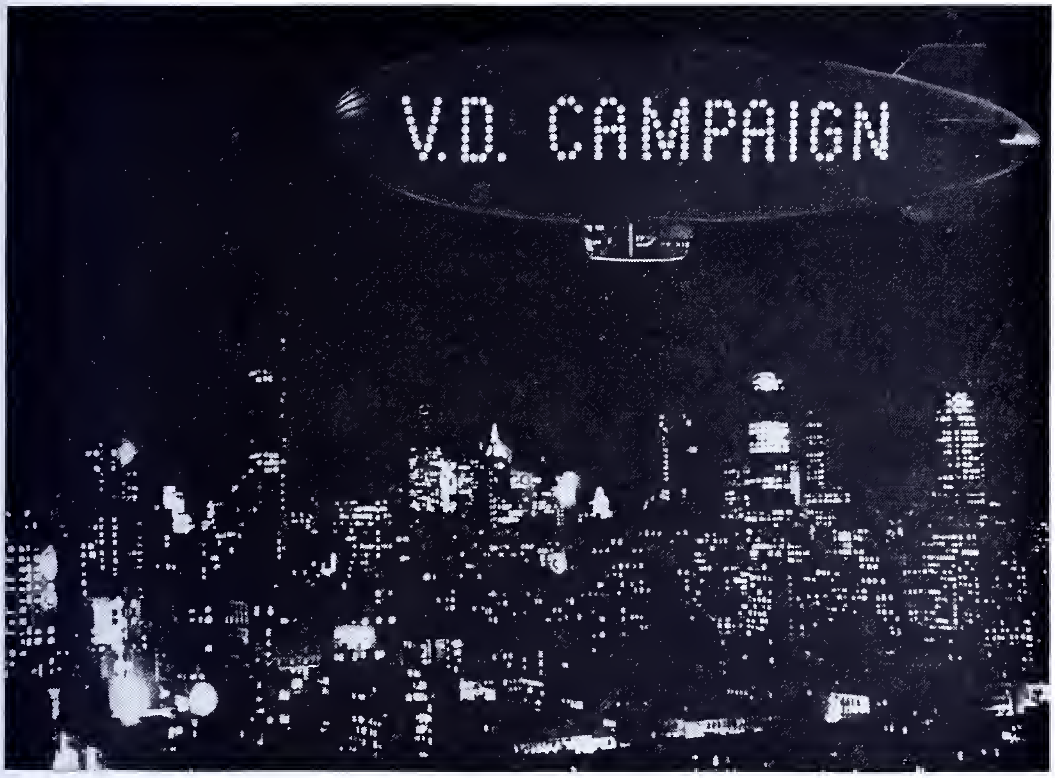

FIGURE 6.—A 253-foot blimp cruised over the city at night.

were purchased and distributed through campaign funds.

*Leaflets, Pamphlets, and Magazines.*—One of our early projects was to mail informational material to various occupational groups whose members were in contact with the public. Specially designed 4-page leaflets,[9] each emphasizing a specific occupation and its role in the campaign, were sent to barbers, bartenders, beauty-shop operators, bellboys, bowling-alley owners, druggists, filling-station managers, poolroom attendants, retail-liquor dealers, rooming-house proprietors, skating-rink managers, taxi drivers, and waitresses. These leaflets present in simple form the principal facts about syphilis and gonorrhea. Approximately 59,000 of these, each carrying the address of our diagnostic center, were distributed during the course of the campaign.

Copies of "My Story" (*2*) magazine were sent to doctors for their waiting rooms, to all venereal disease clinics, and to beauticians, laundries, office-building managers, and a number of other groups. The demand for this publication was consistently high, and 5,900 copies were used in the course of the campaign, with an estimated readership of at least 29,000.

We sent about 7,900 copies of the 28-page pamphlet "Out in the Open" (*3*) to women's clubs, civic organizations, and other groups whose cooperation in the campaign was sought.

For use in boys' clubs and other young male groups, we distributed about 7,500 copies of the baseball (*4*) and 5,000 copies of the football (*5*) edition of the 8-page magazine, "Facts."

In order to keep the cooperating and sponsoring agencies acquainted with the aims and progress of the campaign the staff prepared a 6-page direct-mail booklet, "The 45,000." This pamphlet, in red and blue, described the campaign's objectives, indicated the need for cooperation on the part of city agencies, and listed the cooperating agencies. About 5,500 copies were distributed to key persons and organizations.

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[9] Health Publications Institute, Raleigh, N. C.

In response to requests received as a result of offers made in news releases, 200 VD comic books (*6*) were mailed to various individuals.

The staff produced a 4-page leaflet, "We're Looking for VD," and 63,000 copies were included in various mailings. Through the cooperation of an insurance company serving a large number of families in the selected areas, copies of this leaflet were mailed with monthly statements to over 5,000 persons.

Pamphlets, magazines, and other printed literature, with the exception of the tabloid newspaper, were estimated to have reached not more than 7 percent of the persons living in the two areas of high prevalence.

*Stickers.*—Two thousand washroom stickers were distributed to industrial firms, business concerns, and retail shops, while 100,000 gummed labels carrying the campaign's official "Stop VD Now" symbol (fig. 7) in four colors were put on washrooms and store windows and on envelopes and packages mailed from campaign headquarters.

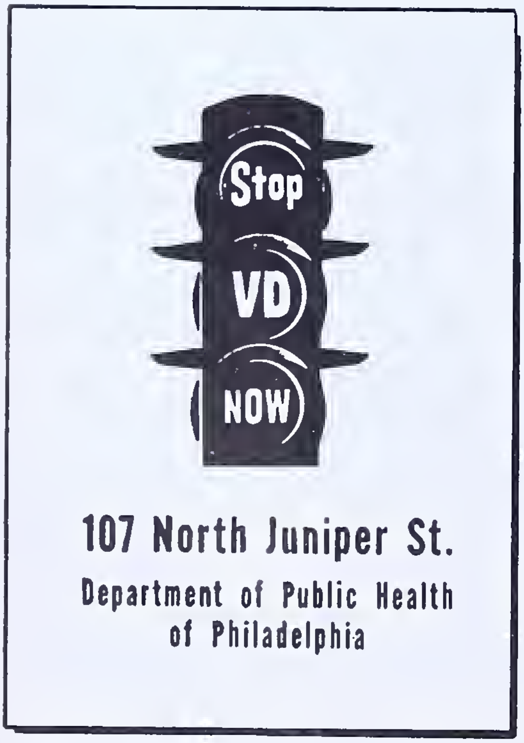

FIGURE 7.—100,000 stickers carried the campaign's official slogan.

*Street Banners, Signs, and Posters.*—Following a precedent established in one of our earlier educational projects, during October a street banner was hung over one of the city's busiest intersections (fig. 8).

A large sign was erected over the doorway of the central diagnostic unit. This sign spanned the area occupied by the adjacent chest X-ray station to encourage patients to use both facilities.

On the basis of data supplied by the Philadelphia Traffic Engineering Bureau, we estimated that 5 percent of the individuals living in the two areas were reached by the street banner display.

Also designed for local use were two bulletin-board posters and an easel card for counter and store-window display; 1,500 of these were distributed to large chain stores and small retail outlets. The bulletin-board posters were also distributed to industrial concerns.

*Films and Lectures.*—Venereal disease films were distributed to movie theaters throughout the city, and private showings were given to various clubs and citizens' groups. Talks and lectures were provided for interested groups, at which time literature was distributed to the audience. Film showings were estimated to have reached somewhere between 3 and 5 percent of the persons in the two high-prevalence areas.

*Form Letters.*—Approximately 17,000 mimeographed form letters were sent to various individuals and organizations. Among these were letters to industrial concerns offering a preemployment blood test and monthly publicity releases to 100 industries each employing over 1,000 persons. Other letters were sent to sports writers, broadcasters, boys' clubs, Police Athletic Leagues, playgrounds, barber-supply houses, beauticians, laundries, office-building managers, juke-box operators, community councils, home and school associations, health and welfare chairmen, and theater managers.

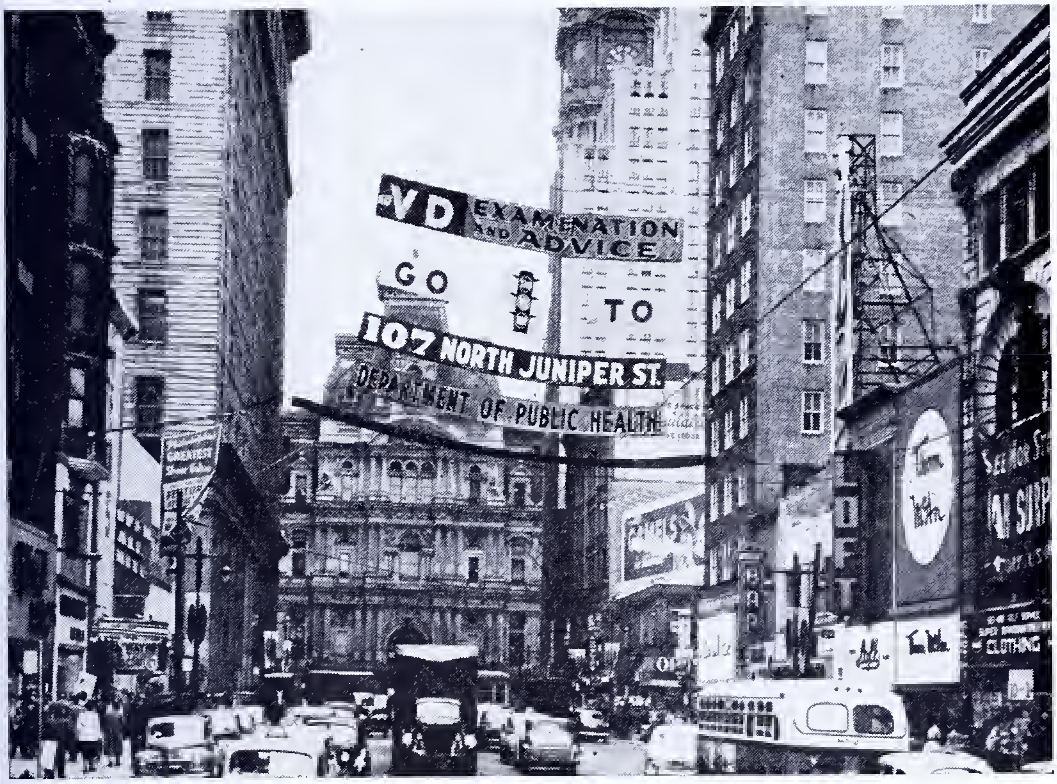

FIGURE 8.—A street banner hung over one of the city's busiest intersections.

## Summary

The Philadelphia campaign was based on the theory that educational methods for case finding should be concentrated in the areas of the population where venereal disease prevalence is known to be high. In general, these areas correspond to those of greatest population density.

Educational methods should be closely related to the socioeconomic status of the selected areas. In many instances, the available material was found to be inadequate.

The emphasis was placed upon one readily accessible diagnostic center, and the address of this center appeared on all campaign material.

The data supplied by patients as to their reason for reporting were recorded and later evaluated statistically in order to determine the relative effectiveness of different educational methods. The analysis of their reasons will be the subject of our second paper and the evaluation of the effectiveness of the campaign the subject of a third paper. While such data are essentially germane only to the Philadelphia area, they provide a general guide to patient response that may have broader application.

## References

1. WRIGHT, J. J.; SHEPS, C. G.; GIFFORD, A. E.: Reports of the North Carolina syphilis studies. IV. Some problems in the evaluation of venereal disease education. J. Ven. Dis. Inform., 31: 125–133, May 1950.
2. My Story. VDgraphic 125. Health Publications Institute, Inc., Raleigh, N. C.
3. Out in the Open. VDgraphic 5. Health Publications Institute, Inc., Raleigh, N. C.
4. Facts on American Sports and Health, Baseball Edition, 1949. Health Publications Institute, Inc., Raleigh, N. C.
5. Facts on American Sports and Health, Football Edition, 1949. Health Publications Institute, Inc., Raleigh, N. C.
6. Doc Carter Comes to Carbiville. VDgraphic 71. Health Publications Institute, Inc., Raleigh, N. C.

# Dental Hypoplasias in Relation to Congenital Syphilis

S. B. Beecher, M. D.,[1] H. N. McIntosh, D. D. S.,[2] and E. J. McCart, B. A.[3]

A survey of incomplete and defective dental development in relation to congenital syphilis was made in the 18 public schools for Negroes in Pemiscot County, Mo. This county has a population of 45,000, including 13,000 Negroes, and is located in the extreme southeastern end of the State, bordered on the east by the Mississippi River, and on the south by Arkansas.

The purpose of this study was to evaluate diagnoses of dental hypoplasias suggestive of congenital syphilis in relation to the actual presence or absence of the disease when substantiated by serologic tests for syphilis.

The venereal disease program in Pemiscot County has been successful in locating cases of primary and secondary syphilis. One of our chief remaining problems is the detection and eradication of cases of congenital syphilis carried over from the earlier days of the county health department, when less emphasis was placed on methods of diagnosing congenital syphilis and the former lengthy treatment schedules were frequently not completed by the patients.

In cooperation with the county medical officer and the Public Health Service venereal disease investigator, the public health dentist planned, as a congenital syphilis case-finding experiment, a thorough dental examination (except X-ray) of pupils in the Negro public schools in this county. According to Thoma (*1*), the syphilitic hypoplasias which affect the permanent incisors and 6-year molars are known as Hutchinson's incisors, mulberry molars, and the bud molar of Pfluger.

## Discussion

There were 2,659 children enrolled in the schools in which examinations were made. The public health dentist examined 1,639 children, including all who were present at school on the days of inspection, and the siblings of those who were found to be infected with congenital syphilis. The very high absentee rate, 38 percent of the total enrollment, suggests to us that congenital syphilis may be more prevalent in the absentee group than in the group inspected.

The names of pupils diagnosed by the dentist as having hypoplasias suggestive of congenital syphilis were entered on the regular epidemiologic report forms as suspects (rather than contacts). Efforts were made to bring in each child listed as a suspect, and the child's mother, for the purposes of obtaining the family's medical history and taking serologic tests for syphilis.

Members of the family of each seropositive child were examined by the medical officer, and both mother and child were sent to the Midwestern Medical Center in St. Louis for final diagnosis and treatment. Members of families of seronegative children were not examined if the family history was negative for such indications of syphilis as stillbirths, spontaneous abortions, snuffles, and the malformations associated with syphilis.

In published studies we were unable to find any satisfactory statistics on sibling infection. In our survey, 13 of the children examined in the schools were found to be infected with congenital syphilis, and their families were investigated for the possibility of finding cases of congenital syphilis in siblings. We found 3 siblings, absent from school on the days of inspection, who, upon examination, were found to have dental dystrophies and positive serologic tests for syphilis. Two of these were identical twins 26 months younger than the other infected child in the family. In another family, the age difference between the two infected children was 24 months. In 5 families, the child with congenital syphilis was an only child. In the other 6 families, sibling congenital syphilis was not demonstrated.

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[1] Medical Director, Pemiscot County Health Department, Caruthersville, Mo.

[2] Public Health Dentist, Missouri Department of Public Health and Welfare, Jefferson City, Mo.

[3] Venereal Disease Investigator, U. S. Public Health Service.

The results of this study are substantially the same as those found by Bertram (2) in a similar study in Oklahoma. Bertram found that 69, or 3.2 percent of 2,156 school children examined, exhibited dental dystrophies suggestive of congenital syphilis. Serologic testing for syphilis disclosed that 24.5 percent of the 69 suspected children were infected. In our study, 54, or 3.2 percent of 1,639 school children examined, had dental anomalies. Sixteen of the 54, or 32 percent, were diagnosed as having congenital syphilis. Bertram found a higher prevalence of congenital syphilis in the older school children than in the younger ones. His findings are substantiated by evidence in our study which shows that 81 percent of the infected school children were over 10 years of age. The age and percentage distribution of infected children discovered in our study are shown in table 1.

The chief findings of our survey are tabulated below:

| | |
|---|---|
| Number of children examined | 1,639 |
| Number of examinees diagnosed as having syphilitic hypoplasias | 54 |
| Percent of examinees diagnosed as having syphilitic hypoplasias | 3.2 |
| Number of suspects who had serologic tests for syphilis | 50 |
| Number of suspects who were diagnosed as having congenital syphilis (including 3 siblings) | 16 |
| Percent of suspects who were diagnosed as having congenital syphilis | 32 |
| Average age (in years): | |
| Children inspected by dentist | 10.2 |
| Children diagnosed as having syphilitic hypoplasias | 10.8 |
| Children diagnosed as having congenital syphilis | 11.9 |

**Table 1.**—***Age and percentage distribution of 54 children with suspicious dental anomalies diagnosed as having congenital syphilis***

| Age (in years) | Number of children with suspicious dental anomalies | Number of suspected children diagnosed as having congenital syphilis | Percent of total number of children diagnosed as having congenital syphilis |
|---|---|---|---|
| 6 | 6 | 2 | 12.5 |
| 7 | 5 | | |
| 8 | 2 | | |
| 9 | 4 | | |
| 10 | 9 | 1 | 6.25 |
| 11 | 5 | 3 | 18.75 |
| 12 | 8 | 2 | 12.5 |
| 13 | 6 | 3 | 18.75 |
| 14 | 4 | 3 | 18.75 |
| 15 | 3 | 1 | 6.25 |
| 16 | 1 | 1 | 6.25 |
| 17 | | | |
| 18 | 1 | | |
| Total | 54 | 16 | 100 |

## Conclusions

We believe that this was a worth-while case-finding project. Of 54 suspects reported by the dentist, 50 were serologically tested for syphilis, and 16 were found to be infected with congenital syphilis. No dental anomaly suggestive of congenital syphilis has ever been reported to this health department by practicing dentists, but the results of this project indicate that securing the cooperation of the dentists would be of practical value in case finding. In our opinion, this method of discovering cases of congenital syphilis would be most useful in areas of low prevalence where mass blood testing is not feasible. With little additional work, the dentists could make the names of persons with suspicious dental anomalies available to the venereal disease investigator, who could expect to find 25 percent of these suspects infected with congenital syphilis.

## References

1. Thoma, Kurt H.: Oral Pathology, 2d ed., St. Louis, 1944. Pp. 238–246.
2. Bertram, Frank P.: Rapid dental surveys: A case finding procedure for congenital syphilis. J. A. D. A., 40: 45–49, January 1950.

### Announcement

The fourth annual symposium on "Recent Advances in the Study of Venereal Disease" will be held in Washington, D. C., on April 24 and 25. The meetings will be sponsored jointly by the American Venereal Disease Association and the Experimental Therapeutics Study Section of the National Institutes of Health, Public Health Service, Federal Security Agency. The symposium will be held in the auditorium of the Federal Security Building, Independence Avenue between Third and Fourth Streets SW. Scientific sessions will begin each day at 10 a. m. The program includes papers on fundamental biology, epidemiology, and clinical aspects of venereal disease. All persons interested in this branch of medical research are cordially invited to attend.

The annual business meeting of the American Venereal Disease Association will be held at 9 a. m., Wednesday, April 25.

Copies of the program will be available about April 1. Requests for information should be addressed to Dr. Frederick W. Appel, Executive Secretary of the Experimental Therapeutics Study Section, Division of Research Grants, National Institutes of Health, Bethesda 14, Md., or to Dr. William L. Fleming, Secretary, American Venereal Disease Association, 750 Harrison Avenue, Boston 18, Mass.

### Syphilis Seminar at Paris

In the Alfred Fournier Institute, at Paris, a group of medical scientists gathered for 2 weeks last fall to discuss the value of penicillin in the modern treatment of syphilis. The meetings, held September 25 to October 7, were reported in the WHO Newsletter for November to December 1950.

These doctors, who came from 11 European countries, were joined by several well-known American syphilologists. The American representatives favor intensive use of penicillin in the prevention and treatment of syphilis. They believe that penicillin represents the cheapest, most effective, and most rapid means of curing syphilis in all stages. While European scientists recognize the revolutionary significance of the drug, which can render a patient noninfectious in record time, they consider that it is too early to say whether it gives a complete and certain cure.

Professor H. Gougerot, a leading French expert, believes that it is impossible to know all the effects of a drug which has been in use for only 7 years. He says more research and more experimentation are needed. Meanwhile, he and other European clinicians advocate the "double chance of cure;" i. e., penicillin plus continuation of older methods.

The American venereologists brought with them some imposing results of experiences in the U. S. A. with penicillin treatment of syphilis. Led by Dr. C. Rein, of New York University, they showed numerous charts and statistics to demonstrate that penicillin was the most rapid, safe, and economical method of curing syphilis.

Dr. Norman Ingraham, Jr., of Philadelphia, told of a 7-year study made on more than 10,000 syphilitic pregnant women. It was found that with penicillin treatment, the probability of the woman having a normal, full-term, living infant was about 86 percent. Untreated early syphilis in an otherwise similar group of patients resulted in a normal infant in about 18 percent of the cases only. According to Dr. Ingraham, these experiments show that suppression of congenital syphilis by prenatal treatment of the expectant mother has now been rendered distinctly probable.

One important conclusion which came out of the discussions was that more advanced forms of syphilis, such as neurosyphilis, were losing some of their importance, since the disease could now be checked rapidly and safely in its early stages.

Results obtained in the U. S. A. with penicillin were examined in the light of experiments conducted in Europe, especially in France, where the participants had the opportunity of visiting laboratories and hospitals in which research and clinical work are being carried out. The Hôpital Saint Louis, one of the oldest medical institutions of the French capital, offered the forty-odd seminar members the possibility of witnessing interesting results achieved with the newest treatment methods. At the same time, American and European scientists exchanged views on the respective merits of serologic tests developed recently for the diagnosis of syphilis, and visited the world-renowned Pasteur Institute where tests of this type are being conducted.

### Two Venereal Disease Publications Scheduled

A new, illustrated booklet describing "The National Venereal Disease Control Program" will be available soon. The development of the program is told from its beginning during the First World War through present-day activities.

Also scheduled for early publication is the 1950 Venereal Disease Clinic Directory. This listing of every venereal disease clinic in the United States gives locations, hours, and fee systems. The section for each State begins with a brief outline of the premarital and prenatal laws and laboratory services available in that State with regard to venereal disease. A wide initial distribution of this directory is planned, to include State and local health departments as well as the Armed Forces and all other interested agencies.

Single copies of these two publications will be sent upon request to Dr. Theodore J. Bauer, Chief, Division of Venereal Disease, United States Public Health Service, Washington 25, D. C.

## CURRENT LITERATURE

A. M. A. Am. J. Dis. Child, Chicago

Use of systematically administered penicillin as a prophylactic against ophthalmia neonatorum. Lewis K. Sweet. A. M. A. Am. J. Dis. Child., 80: 868–871, Nov. 1950.

A study was made at Gallinger Municipal Hospital between October 1, 1948, and December 31, 1949, to determine the value of a single intramuscular dose of 50,000 units of crystalline penicillin as a prophylactic agent against ophthalmia neonatorum. Alternate newborn infants received the usual Credé prophylaxis with 1-percent silver nitrate solution. There were 5,919 infants in the study. Intramuscular penicillin seems to be as effective as silver nitrate therapy in reducing gonococcic conjunctivitis, appears to be more effective in preventing nongonococcic conjunctivitis, and eliminates almost entirely the transient nonbacterial conjunctivitis.

Studies on absorption, distribution and excretion of aureomycin, chloramphenicol and terramycin. Andrew D. Hunt, Jr. A. M. A. Am. J. Dis. Child., 80: 871–872, Nov. 1950.

Studies with these antibiotics in infants and children are briefly reported.

### A. M. A. Arch. Dermat. & Syph., Chicago

The dying syphilologist. President's address. Charles C. Dennie. A. M. A. Arch. Dermat. & Syph., 62 : 615–621, Nov. 1950.

In this general discussion the author expresses the belief that the use of penicillin in the treatment of syphilis is one of the reasons for the poor teaching of syphilology and dermatology at the medical schools today.

Granuloma inguinale and its treatment with oral aureomycin. Milton Zises and George C. Smith. A. M. A. Arch. Dermat. & Syph., 62 : 642–647, Nov. 1950.

Treatment of 17 Negro patients at the South Carolina Public Health Hospital with total dosages of 25 gm. of aureomycin over a 12½-day period is discussed. All the patients remained completely healed for periods of 1 to 7 months following the treatment.

Bismuth penicillin in the treatment of syphilitic orchitis of rabbits. Samuel Monash and John A. Kolmer. A. M. A. Arch. Dermat. & Syph., 62 : 689–693, Nov. 1950.

From the results of a study in which 4 groups of 10 rabbits each were given intramuscular injections of varying dosages, authors conclude that bismuth penicillin suspended in sesame oil with 2 percent aluminum monostearate is approximately twice as curative as sodium penicillin G suspended in peanut oil and white wax.

Studies on the L. E. phenomenon. Seth S. Barnes, Thomas W. Moffatt, Clinton W. Lane, and Richard S. Weiss. A. M. A. Arch. Dermat. & Syph., 62 : 771–785, Dec. 1950.

The sternal marrow or blood serum was tested for L. E. cells in 44 patients with lupus erythematosus and 92 control patients with various types of diseases, including 3 with syphilis with high Kahn titer. Several samples of the syphilitic blood were tested but they failed to show the L. E. phenomenon.

Formaldehyde in the treatment of warts. Francis W. Lynch and Irvin M. Karon. A. M. A. Arch. Dermat. & Syph., 62 : 803–813, Dec. 1950.

The records of 736 private patients with various types of warts, seen from 1945 to 1949, 177 of whom were treated with formaldehyde in Aquaphor, were reviewed in an attempt to evaluate its efficacy. The authors do not think that the ointment should be applied to condylomas.

### A. M. A. Arch. Ophth., Chicago

Localization of lesions causing Horner's syndrome. Norman S. Jaffe. A. M. A. Arch. Ophth., 44 : 710–728, Nov. 1950.

A system for localization of the lesions by (*a*) tests which determine the level of the sympathetic lesion, and (*b*) evaluation of signs and symptoms attributed to involvement of neighboring structures, is described. One of four cases presented as illustrations was a 59-year-old Negro patient with syphilitic aneurysm of the aorta at the City Hospital, New York.

### Acta obst. et gynec. Scandinav., Stockholm

Male sterility, diagnosis, aetiology, and treatment. Eric Nordlander. Fifth Meeting of Northern Association of Obstetrics and Gynecology, August 26–28, 1948. Acta obst. et gynec. Scandinav., 30 : 220–251, Supp. 7, 1950.

The author discusses diagnostic aids, etiologic factors, and therapeutic possibilities in male sterility. The role played by gonorrhea in producing sterility is considered.

### Am. J. Clin. Path., Baltimore

Pathologic findings in premature infants. James B. Arey and John Dent. Am. J. Clin. Path., 20 : 1016–1025, Nov. 1950.

A study of autopsy records revealed that congenital syphilis was responsible for 10 out of 84 deaths of liveborn premature infants at the Charity Hospital of Louisiana.

Metallo-penicillins. Plasma concentrations of penicillin after oral administration. William P. Boger and John O. Beatty. Am. J. Clin. Path., 20 : 1070–1075, Nov. 1950.

A study of the blood samples from six healthy adult men after single oral 500,000-unit doses of various penicillins showed that aluminum, bismuth, and ferric salts, when orally administered, do not result in higher plasma concentrations than that following ingestion of potassium penicillin.

## AM. J. HYG., BALTIMORE

Age incidence and seasonal development of neutralizing antibodies to Lansing poliomyelitis virus. Thomas B. Turner, David H. Hollander, Sonia Buckley, U. Pentti Kokko, and Charles P. Winsor. Am. J. Hyg., 52 : 323–347, Nov. 1950.

In this study, Lansing neutralization tests were made on a total of 970 individuals, including 163 with clinical evidence or history of syphilis, living in the Baltimore area during 1941–42 and 1947–48. Although 9 of the 10 age groups studied showed fewer positives among the syphilitic children, there was no obvious explanation for the differences, which, at any rate, were so small that no distinction between them has been made in the analysis of the over-all data.

## AM. J. M. SC., PHILADELPHIA

The female urethra. Progress of Medical Science. Frank B. Block. Am J. M. Sc., 220 : 683–696, Dec. 1950.

In this review of the literature and discussion of the part played by the female urethra in the diagnosis and treatment of pelvic disease, the author considers the role of lymphogranuloma venereum in producing urethral stricture or ulceration.

## AM. J. OBST. & GYNEC., ST. LOUIS

Bacteriological studies in salpingitis with special reference to gonococcal viability. J. Mason Hundley, Jr., William K. Diehl, and Joseph W. Baggott. Am. J. Obst. & Gynec., 60 : 977–984, Nov. 1950.

At the Department of Gynecology, Hospital of the University of Maryland, a bacteriologic survey, with special reference to the presence of the gonococcus, was made in 80 patients to determine whether "flare-ups" of acute salpingitis were due to reinfections arising from dormant cells in the tubal wall or from infections existing in the urethra and cervix. The authors conclude that gonococci infection of the tubes is short-lived and repeated attacks of salpingitis are due to reinfection from the lower generative tract. Studies on tuberculous salpingitis are also included.

## AM. PRACT. & DIGEST TREAT., PHILADELPHIA

The effect of digitalis and a mercurial diuretic on the electrolyte balance in patients with congestive heart failure. Don W. Chapman and Carl F. Shaffer. Am. Pract. & Digest Treat., 1 : 1172–1176, Nov. 1950.

At the Baylor University College of Medicine in Houston, Tex., electrolyte studies of whole blood and serum, and urinary sodium and potassium, were made in 19 patients with total cardiac decompensation, including 3 with syphilitic heart disease.

What's your diagnosis? Am. Pract. & Digest Treat., 1: 1176–1177, 1208, Nov. 1950.

This case protocol given third- and fourth-year students for the clinicopathologic conference, Vanderbilt University School of Medicine, Nashville, Tenn., concerned a 25-year-old colored man who had received neoarsphenamine for a chancre. Clinical diagnosis was hemorrhagic encephalitis due to neoarsphenamine, and the anatomic diagnosis was hemorrhagic encephalitis.

## ANN. INT. MED., LANCASTER

Clinical experiences with a new mercurial diuretic for subcutaneous administration. Joseph B. Vander Veer, P. T. Kuo, and David S. Marshall, II. Ann. Int. Med., 33 : 1215–1223, Nov. 1950.

In this study 111 patients suffering from edema of cardiac, renal, and hepatic origin, including 8 with syphilitic heart disease, were given a total of 891 subcutaneous injections of Thiomerin. More than 90 percent of the patients responded satisfactorily to the treatment.

## ANN. TUBERC., NARA

Studies on agglutination reaction of antigen-coated particles. III. Examination of syphilitic antigen. Shiro Nagao and Susumu Momoi. Ann. Tuberc., 1 : 67–70, June 1950.

In this study the effect of various particles upon the occurrence of antigen-antibody flocculates in syphilitic precipitin reaction was examined. From a brief review of the literature and the results of this study, the authors conclude that antigens containing collodion or lanolin particles or a bacterial suspension make an antigen-antibody reaction more sensitive.

### ANN. WEST. MED. & SURG., LOS ANGELES

Differential diagnosis of granulomata of the colon. Charles A. Kruse and Alan R. Bleich. Ann. West. Med. & Surg., 4 : 603–608, Oct. 1950.

A case of granuloma of the large bowel in a 29-year-old white male is reported. A review of the literature is presented, together with a classification of granulomata of the colon. Syphilis is one of the diseases to be considered in the differential diagnosis.

### CANAD. J. PUB. HEALTH, TORONTO

The relationship between changes in cerebrospinal fluid and the phase and activity of neurosyphilis. Jules Archambault. Canad. J. Pub. Health, 41 : 464–470, Nov. 1950.

From a study of the Wassermann reaction, cell count, protein content, and colloidal reaction tests used for early diagnosis of neurosyphilis, the author concludes it is clear there exists a definite relationship between the findings of these tests and the syphilitic process in the central nervous system.

### CHRON. WORLD HEALTH ORGAN., GENEVA

Lymphogranuloma venereum. Chron. World Health Organ., 4 : 345–347, Nov. 1950.

Clinical manifestations, diagnosis, and treatment are briefly discussed.

Bejel-control project in Iraq. Notes and News. Chron. World Health Organ., 4 : 354–355, Nov. 1950.

Penicillin treatment, epidemiologic, and laboratory studies will be carried on in this control project undertaken by the Government of Iraq with the assistance of WHO.

### CLIN. MED., WILMETTE

Cardiovascular syphilis. Gerald Flaum and Evan W. Thomas. Clin. Med., 57 : 212–213, Nov. 1950.

Prevention, diagnosis, and treatment of the disease is briefly discussed.

### FLORIDA HEALTH NOTES, JACKSONVILLE

Public health highlights sketch dramatic picture. Venereal disease control. Florida Health Notes, 42 : 212, Dec. 1950.

Annual report of the Florida State Board of Health shows that during 1949, 14,605 cases of gonorrhea were reported as compared with 18,088 in 1948 and 12,304 cases of syphilis as compared with 14,823 in 1948.

### ILLINOIS HEALTH MESSENGER, SPRINGFIELD

Communicable disease gains and losses. Illinois Health Messenger, 22 : 84, Nov. 1. 1950.

State morbidity records show syphilis dropped from 10,088 cases in the first 37 weeks of 1949 to 8,167 in the corresponding period of 1950, while gonorrhea decreased from 21,543 cases to 16,956.

### J. A. M. A., CHICAGO

Reiter's syndrome: Effect of pituitary adrenocorticotropic hormone (ACTH) and cortisone. M. A. Ogryzlo and Wallace Graham. J. A. M. A., 144 : 1239–1243, Dec. 9, 1950.

In this study two patients received one course of pituitary adrenocorticotropic hormone in varying doses, and a third received this drug followed by cortisone, both intramuscularly and orally. The prompt and dramatic response in each instance and the sustained improvement in two patients, the third still being under observation, suggests a possible therapeutic application of these drugs in Reiter's syndrome.

Subconjunctival injection of cortisone in iritis. Raphael Koff, Sol Rome, Richard Kasper, Robert R. Commons, Richard Button, and Paul Starr. J. A. M. A., 144 : 1259–1260, Dec. 9, 1950.

The purpose of the report is to demonstrate a practical, inexpensive method of utilizing cortisone for treatment of diseases of the eye. Of nine patients with acute or acute recurrent iritis, including one with Reiter's syndrome, who were treated by this method, eight were decidedly improved.

J. A. M. A., CHICAGO—Continued

Causes of fear among obstetric patients. James Ramsdell Bloss. J. A. M. A., 144: 1358–1361, Dec. 16, 1950.

In this general discussion comment is made that because of the scientific advances in today's therapy the physician may with confidence assure antepartum patients that the possibility of transmission of syphilitic infection to the offspring may be erased from the list of their fears.

Verrucae, a dermatologic problem. Clinton W. Lane. J. A. M. A., 144: 1361–1365, Dec. 16, 1950.

Diagnosis and treatment of four types, including verruca acuminata, are briefly discussed. In personal experience over a period of 24 years the author found that 80 percent of all venereal warts disappeared with one and 20 percent with two applications of podophyllum.

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J. ALLERGY, ST. LOUIS

Human skin sensitivity to penicillins G, BT, and O. Demonstration of cross sensitization. George Risman and William P. Boger. J. Allergy, 21: 425–431, Sept. 1950.

Intracutaneous skin tests were performed on 276 persons using penicillins G and BT and on 224 persons using penicillins G and O (AT). The incidence of positive skin reactions to all 3 penicillins showed an increase in persons with previous exposure to penicillin G, and a greater increase in those with a history of previous general reactions to penicillin G. Positive skin tests to all 3 penicillins were observed in persons who denied ever having received penicillin therapy as well as in those who had received therapy.

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J. BACT., BALTIMORE

The flagellation of spirochetes. Einar Leifson. Notes. J. Bact., 60: 678–679, Nov. 1950.

A brief note on staining of the spirochetal flagella including those of *Treponema pallidum* is presented.

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J. INVEST. DERMAT., BALTIMORE

Medical specialty research in a university: its organization and support in a department of dermatology. Donald M. Pillsbury. J. Invest. Dermat., 15: 275–290, Oct. 1950.

An experiment in the development, administration, and support of reasonably adequate research facilities in a department of dermatology is described. Among the problems now confronting many departments of dermatology and syphilology is that clinical syphilology, aside from a few departments located in the southeastern United States and in port cities, is becoming an anachronism. The continuing need for physicians who have a broad background in the clinical management of syphilis is discussed.

Procaine penicillin administered orally: comparison with sodium penicillin. William P. Boger and John O. Beatty. J. Invest. Dermat., 15: 373–379, Nov. 1950.

Thirty individuals comprised of 12 healthy young adults and 18 hospital patients without obvious cardiac, hepatic, or renal disease were studied at the Department of Medicine of the University of Pennsylvania. Detailed results are presented.

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J. LAB. & CLIN. MED., ST. LOUIS

The treatment of various infections with terramycin. Eston R. Caldwell, Jr., Harold W. Spies, Charles K. Wolfe, Mark H. Lepper, and Harry F. Dowling. J. Lab. & Clin. Med., 36: 747–753, Nov. 1950.

Efficacy of terramycin in treatment of 171 patients including 7 with acute gonorrheal urethritis is discussed. No complications or relapses occurred in a 15-day period of observation following 4- to 5-day treatment of the 7 gonorrheal patients.

Two-hour versus three-hour administration of crystalline penicillin G. The treatment of early syphilis. Herman N. Bundesen, Jack Rodriquez, and George X. Schwemlein. J. Lab. & Clin. Med., 36: 759–762, Nov. 1950.

Comparative data from treatment of 184 patients with primary and secondary syphilis, given 2.4 million units of aqueous crystalline penicillin G at 2-hour rather than the usual 3-hour intervals, are presented to prove that both intervals are, for the purpose of therapeutic efficiency, of equal value.

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J. MISSOURI M. A., ST. LOUIS

Recent concepts of rheumatoid arthritis. Oliver Abel, Jr. J. Missouri M. A., 47: 805–809, Nov. 1950.

### J. MISSOURI M. A., ST. LOUIS—Continued

In this general discussion on etiology and treatment, it is pointed out that when arthritis starts in one or more large joints or the involvement of joints begins asymmetrically, the diagnosis of rheumatoid arthritis should never be made until the possibility of specific infectious arthritis, chiefly gonococcic or gout, has been eliminated.

### J. MT. SINAI HOSP., NEW YORK

Hyaluronidase inhibitor of human blood serum in health and disease. David Glick. J. Mt. Sinai Hosp., 17 : 207–228, Nov.–Dec. 1950.

In this study, a viscosimetric method was employed to determine the hyaluronidase activity and its inhibition in infectious diseases, including 13 cases of syphilis. Results show that syphilis itself has little effect on the inhibitor level, but when malaria therapy is instituted, the inhibitor, temperature, and sedimentation rate all rise. After treatment has been discontinued they recede to normal.

### J. NEUROL., NEUROSURG. & PSYCHIAT., LONDON

Syphilitic optic neuritis. G. S. Graveson. J. Neurol., Neurosurg. & Psychiat., 13 : 216–224, Aug. 1950.

Case reports of five patients with syphilitic optic neuritis seen during the last 2 years are presented. The clinical course of the disease, visual acuity, ophthalmoscopic changes, changes in the field of vision, other neurologic abnormalities, serology and cerebrospinal fluid changes, prognosis, and differential diagnosis are discussed.

### J. PEDIAT., ST. LOUIS

Sodium sulfacetimide for the prophylaxis of gonorrheal ophthalmia neonatorum. Preliminary report. J. Edmund Bickel. J. Pediat., 37 : 854–857, Dec. 1950.

A report is presented of a study made at Louisville General Hospital of 1,907 infants born from March 1, 1949, to March 1, 1950. The infants were divided into three groups, with each group receiving one of three prophylactic agents: 1-percent silver nitrate drops, 30-percent sodium sulfacetimide drops, or 10-percent sodium sulfacetimide ointment. Two cases of gonorrheal ophthalmia neonatorum occurred during the study, one in an infant receiving silver nitrate, and the other in an infant receiving 10-percent sodium sulfacetimide ointment.

### J. ROY. ARMY M. CORPS, LONDON

An improved Wassermann technique. The value of a dilute antigen suspension assessed in a series of 14,952 tests. H. M. Rice. J. Roy. Army M. Corps, 95 : 146–150, Sept. 1950.

A new technic developed by the author is described. This consisted of the use of a fourth row in the Wassermann test, employing 3 M. H. D. complement and 1/100 antigen for increasing the sensitivity while retaining the specificity of the reaction. In 117 of 14,952 tests analyzed, the fourth tube enabled a report of doubtful to be given on a test which would otherwise have been reported negative. In 7 of these this doubtful reaction was associated with a negative Kahn result.

Granuloma inguinale in Southern Rhodesia and its treatment with antibiotics. R. R. Willcox. J. Roy. Army M. Corps, 95 : 167–172, Sept. 1950.

Seventeen Bantu Negro patients, observed during a personal 6-month survey of venereal diseases, were treated with streptomycin, aureomycin, or Chloromycetin. From the dramatic results, it is concluded that in the Bantu the reaction of the disease to antibiotics is similar to that in the American Negro.

### M. PRESS, LONDON

Aetiology and modern treatment of cystitis in the male. S. N. Lytle. Modern Treatment in General Practice. M. Press, No. 5811 : 267–270, Sept. 20, 1950.

Among the etiologic agents of acute cystitis in the male, gonorrhea is considered. Penicillin is the treatment of choice for gonococcic infections and is useful for other coccic forms of cystitis.

Modern trends in heart disease. (With special reference to treatment.) C. J. Gavey. M. Press, No. 5811 : 270–275, Sept. 20, 1950.

M. PRESS, LONDON—Continued

Among the heart diseases discussed, cardiovascular syphilis is included. It is stated that the advant of penicillin and its apparent cures have produced some latent cases which will manifest tertiary signs later.

MED. ILLUSTRATED, LONDON

"Luotest." A preliminary evaluation in the diagnosis of late syphilis. G. W. Csonka. Med. Illustrated, 4: 389–391, Aug. 1950.

A study was undertaken to evaluate a modification of the luetin test introduced by Rottman. In a series of 155 patients tested, the "Luotest" appeared to give 4 false-negative and 7 false-positive results as against 7 false-negative and 25 false-positive Wassermann reactions.

Magic, medicine, and quackery. Part I. J. Donaldson Craig. Med. Illustrated, 4: 458–464, Sept. 1950.

In this general historical review of quackery, the treatment of syphilis with mercury is discussed.

MOD. MED., MINNEAPOLIS

Modern therapy of syphilis. Arthur C. Curtis. Mod. Med., 18: 90–92, Nov. 15, 1950.

Treatment of all phases of syphilis is discussed briefly. Penicillin is indicated as the drug of choice. Penicillin and the newer antibiotics have made the treatment of syphilis easier, cheaper, quicker, safer, and more effective than ever before.

Venereal diseases other than syphilis. Arthur G. Schoch. Mod. Med., 18: 93-94, Nov. 15, 1950.

Treatment is discussed for gonorrhea, granuloma inguinale, chancroid, and lymphogranuloma venereum. If the venereal diseases are treated as a whole, ignoring the exactness of differential diagnosis, the administration of penicillin coupled with the oral dosage of a sulfonamide or one of the newer antibiotics, for 10 to 14 days will generally meet with success.

NATURE, LONDON

Orally administered antibiotics and the venereal diseases. R. R. Willcox. Nature, 166: 466–468, Sept. 16, 1950.

A review of the literature is presented. The present status of aureomycin, chloramphenicol, and oral penicillin in venereology is considered.

NEW ENGLAND J. MED., BOSTON

Syphilis. G. Marshall Crawford. Medical Progress. New England J. Med., 243: 916–927, Dec. 7, 1950; 955–966, Dec. 14, 1950.

An extensive review of the literature is presented. Control measures, incidence, experimental studies, immunity, therapy, serologic problems, diagnosis, reinfection and relapse, treatment reactions, penicillin sensitivity, and types of syphilis are discussed.

NEW ORLEANS M. & S. J., NEW ORLEANS

Maternal, fetal and infant mortality in Louisiana. John S. LeMasson and J. D. Martin. New Orleans M. & S. J., 103: 234–243, Dec. 1950.

Statistics on the leading causes of maternal and infant mortality from 1925 to 1948 are presented and discussed. The infant death rate from syphilis in 1948 was one-sixth of that in 1925.

NEWS & PLANS, LOUISVILLE

Mass blood test conducted in industry. News & Plans, 2: 2, Nov. 1950.

A blood test survey in which more than 800 blood specimens were taken at an industrial plant in Frankfort, Ky., during the last week of October is briefly discussed.

NOVA SCOTIA M. BULL., HALIFAX

The present status of antibiotic therapy. Stanton M. Hardy. Nova Scotia M. Bull., 29: 265–273, Nov. 1950.

This is a general discussion on the use of antibiotics in treatment of various infections, including venereal diseases.

OHIO PUB. HEALTH, COLUMBUS

Mpltiple screening and specialized programs. Joseph W. Mountin. Ohio Pub. Health, 14: 1–4, Dec. 1950.

In this general discussion, the evolution, purpose, costs, advantages, and re-

OHIO PUB. HEALTH, COLUMBUS—Con.

lation of multiple screening to specific testing for venereal diseases, tuberculosis, and other ailments are considered.

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OKLAHOMA HEALTH BULL., OKLAHOMA CITY

Evolution of multiple screening is explained. A. L. Chapman. Oklahoma Health Bull., 8 : 32, Aug. 1950.

A detailed description of the purposes and functions of multiple screening is presented.

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PENNSYLVANIA M. J., HARRISBURG

An experiment in the maintenance of positive health. Gulden Mackmull, Joseph J. Cava, and William Harvey Perkins. Pennsylvania M. J., 53 : 1182–1184, Nov. 1950.

In a series of 623 patients examined under a program of periodic examination of well adults, started in 1948 at the Health Maintenance Clinic of the Fife-Hamill Memorial Health Center, Philadelphia, only 18 individuals were found to have no physical abnormalities which required correction; of the remaining, 17 were found to have syphilis.

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PHILADELPHIA HEALTH BULL., PHILADELPHIA

VD chief returns from W. H. O. Mission. Philadelphia Health Bull., p. 6, Oct. 1950.

Dr. Norman R. Ingraham, Jr., Department of Public Health, Philadelphia, reports that the United States group, following a 2-month mission, found in general that European medical and public health practices in venereal disease control were far behind this country and that they have been slow in accepting the newer technics, especially penicillin therapy.

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PUB. HEALTH NEWS, TRENTON

Early discovery and treatment of congenital syphilis. Pub. Health News, 31 : 377, Dec. 1950.

Dr. Walter Clarke, executive director of the American Social Hygiene Association, discusses the Association's five-point program for prevention and control of congenital syphilis.

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SOCIAL HYG. NEWS, NEW YORK

Who can match this? Social Hyg. News, 25 : 2, Dec. 1950.

Congenital syphilis has all but disappeared from the State of Minnesota. In 1949, there was only one infected baby in 73,627 live births.

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U. S. ARMED FORCES M. J., WASHINGTON

Medical history of the Berlin Airlift. Harry G. Moseley. U. S. Armed Forces M. J., 1 : 1249–1263, Nov. 1950.

This report on the Airlift includes a brief discussion of the problem of control of venereal diseases, the incidence of which is stated to have been excessive among the American troops.

The clinical use of antibiotics. IV. Treatment of infectious processes. Perrin H. Long. U. S. Armed Forces M. J., 1 : 1273–1280, Nov. 1950.

A preparation of penicillin G is recommended as the drug of choice for gonococcic and spirochetal infections while either aureomycin or chloramphenicol should be used in lymphogranuloma venereum cases.

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WHO NEWSLETT., GENEVA

Young volunteers in Yugoslav anti-VD programme. WHO Newslett., No. 10 : 1, Oct. 1950.

Dr. E. Gurney Clark, consultant in venereal disease of the World Health Organization, in reporting on an all-out campaign against endemic syphilis in Yugoslavia, states that the campaign is unequaled anywhere in perfection of details, accuracy of records, and excellence of execution.

Regional health conferences . . . in Istanbul. WHO Newslett., No. 10 : 4, Oct. 1950.

In addition to a bejel control demonstration to be carried out in Iraq and parts of Syria and Jordan, with the help of UNICEF, a survey of this nonvenereally transmitted form of syphilis will be made in the Suez area of Egypt.

# STATISTICS

## Reported Syphilis Mortality Rates per 100,000 Population, Continental United States and Each State,[1] 1933–48

| Federal Security Agency regions | 1933 | 1934 | 1935 | 1936 | 1937 | 1938 | 1939 | 1940 | 1941 | 1942 | 1943 | 1944 | 1945 | 1946 | 1947 | 1948 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Region 1—Total | 10.2 | 10.6 | 10.0 | 10.5 | 10.2 | 9.9 | 9.8 | 8.9 | 7.9 | 7.8 | 8.3 | 7.6 | 7.0 | 5.5 | 5.9 | 5.9 |
| Connecticut | 12.9 | 12.3 | 11.4 | 13.2 | 12.0 | 11.8 | 10.9 | 9.1 | 9.0 | 8.5 | 8.7 | 8.2 | 7.6 | 5.9 | 6.0 | 6.6 |
| Maine | 8.9 | 9.5 | 7.0 | 8.6 | 10.2 | 7.3 | 8.7 | 9.0 | 7.1 | 6.3 | 6.6 | 6.6 | 7.2 | 5.7 | 6.2 | 5.1 |
| Massachusetts | 9.5 | 10.2 | 10.0 | 9.9 | 9.8 | 9.3 | 9.4 | 8.6 | 7.4 | 7.6 | 8.5 | 7.1 | 6.2 | 5.2 | 6.1 | 5.6 |
| New Hampshire | 8.0 | 8.4 | 8.6 | 8.4 | 7.8 | 9.3 | 11.7 | 11.4 | 8.1 | 7.6 | 8.9 | 9.5 | 6.2 | 7.3 | 5.2 | 9.0 |
| Rhode Island | 13.3 | 12.6 | 13.6 | 13.1 | 12.8 | 14.3 | 11.0 | 9.3 | 9.3 | 10.6 | 8.7 | 8.3 | 10.9 | 5.8 | 6.0 | 6.0 |
| Vermont | 7.3 | 8.7 | 4.5 | 8.1 | 5.3 | 7.6 | 7.3 | 7.2 | 7.9 | 4.4 | 6.8 | 9.6 | 4.9 | 4.3 | 3.3 | 3.6 |
| Region 2—Total | 14.3 | 15.2 | 14.5 | 15.6 | 16.1 | 15.8 | 15.2 | 14.4 | 13.9 | 13.3 | 13.2 | 11.5 | 10.5 | 9.2 | 8.6 | 7.8 |
| Delaware | 19.4 | 17.6 | 19.5 | 23.0 | 19.0 | 22.6 | 17.1 | 21.6 | 18.3 | 16.7 | 14.8 | 15.7 | 15.0 | 12.5 | 12.0 | 10.3 |
| New Jersey | 13.6 | 13.6 | 13.8 | 14.1 | 14.0 | 14.2 | 13.0 | 12.3 | 11.0 | 11.3 | 11.1 | 9.8 | 7.5 | 6.6 | 7.1 | 7.2 |
| New York | 15.1 | 15.3 | 14.4 | 16.6 | 16.9 | 16.5 | 16.3 | 15.7 | 15.3 | 14.4 | 14.7 | 12.6 | 11.5 | 10.2 | 9.3 | 8.4 |
| Pennsylvania | 13.4 | 15.8 | 14.6 | 14.9 | 15.9 | 15.3 | 14.6 | 13.3 | 13.1 | 12.5 | 12.1 | 10.7 | 10.2 | 9.0 | 8.1 | 7.4 |
| Region 3—Total [2] | 16.9 | 18.6 | 18.1 | 19.2 | 19.4 | 19.3 | 17.6 | 16.4 | 14.6 | 13.5 | 12.5 | 11.9 | 12.6 | 10.4 | 10.7 | 8.8 |
| District of Columbia | 36.5 | 32.7 | 31.9 | 36.4 | 33.9 | 34.6 | 27.4 | 24.4 | 21.1 | 18.4 | 15.6 | 17.4 | 18.4 | 13.6 | 15.7 | 13.3 |
| Maryland | 22.1 | 26.6 | 28.3 | 27.0 | 27.1 | 26.2 | 26.9 | 21.3 | 19.4 | 19.2 | 16.6 | 16.3 | 17.8 | 13.8 | 13.4 | 12.8 |
| North Carolina | 10.6 | 12.8 | 12.0 | 13.6 | 13.6 | 13.8 | 12.4 | 12.2 | 10.3 | 8.9 | 8.3 | 7.9 | 8.3 | 6.7 | 7.2 | 5.1 |
| Virginia | 20.1 | 19.8 | 17.8 | 20.1 | 21.4 | 20.0 | 17.6 | 17.5 | 14.9 | 14.4 | 13.0 | 11.4 | 12.5 | 11.3 | 11.6 | 9.2 |
| West Virginia | 13.7 | 15.5 | 15.6 | 15.1 | 15.3 | 16.9 | 15.3 | 15.0 | 15.0 | 12.7 | 14.5 | 12.9 | 12.6 | 10.7 | 10.5 | 8.6 |
| Region 4—Total | 14.8 | 15.1 | 14.7 | 14.8 | 14.9 | 14.7 | 14.1 | 12.8 | 11.8 | 11.9 | 12.3 | 11.2 | 10.5 | 9.7 | 8.9 | 8.8 |
| Kentucky | 13.4 | 13.0 | 12.2 | 12.4 | 12.7 | 13.0 | 11.9 | 11.1 | 10.4 | 10.7 | 10.2 | 9.4 | 8.7 | 7.9 | 6.9 | 6.7 |
| Michigan | 13.1 | 15.8 | 15.0 | 14.8 | 13.7 | 13.8 | 13.1 | 11.5 | 10.3 | 11.1 | 11.0 | 10.0 | 9.8 | 9.4 | 8.2 | 8.1 |
| Ohio | 16.6 | 15.6 | 15.5 | 15.8 | 16.7 | 16.1 | 15.7 | 14.5 | 13.4 | 13.0 | 14.2 | 12.7 | 11.7 | 10.5 | 10.2 | 10.2 |
| Region 5—Total | 13.1 | 13.9 | 13.4 | 14.1 | 12.9 | 12.5 | 11.3 | 11.7 | 11.2 | 9.7 | 10.5 | 9.5 | 9.5 | 8.5 | 7.6 | 6.6 |
| Illinois | 14.5 | 16.1 | 15.3 | 16.2 | 14.8 | 14.3 | 12.8 | 13.4 | 12.8 | 11.1 | 11.7 | 11.2 | 10.8 | 9.5 | 8.1 | 7.4 |
| Indiana | 16.0 | 15.7 | 15.0 | 16.4 | 15.5 | 14.9 | 14.0 | 14.4 | 13.4 | 11.6 | 12.7 | 11.4 | 11.5 | 10.4 | 10.2 | 8.0 |
| Minnesota | 11.0 | 11.0 | 10.9 | 10.6 | 10.0 | 9.5 | 8.3 | 8.5 | 8.8 | 7.6 | 8.2 | 5.4 | 6.6 | 6.7 | 5.7 | 4.6 |
| Wisconsin | 8.1 | 8.8 | 8.9 | 9.6 | 8.0 | 8.0 | 7.0 | 7.4 | 6.9 | 6.1 | 6.8 | 6.6 | 6.4 | 5.5 | 4.8 | 4.4 |
| Region 6—Total | 19.9 | 21.3 | 20.1 | 20.8 | 22.0 | 22.4 | 20.8 | 20.2 | 18.2 | 14.9 | 14.2 | 14.0 | 12.4 | 11.1 | 10.6 | 9.5 |
| Alabama | 18.4 | 18.5 | 19.3 | 21.5 | 21.4 | 22.8 | 20.6 | 20.7 | 19.2 | 10.8 | 11.1 | 15.3 | 13.2 | 11.3 | 11.1 | 9.9 |
| Florida | 36.3 | 34.6 | 30.2 | 28.6 | 31.4 | 31.1 | 28.1 | 26.4 | 25.0 | 18.0 | 17.2 | 16.5 | 13.6 | 13.3 | 11.3 | 11.2 |
| Georgia | 17.3 | 21.7 | 18.6 | 20.9 | 21.4 | 20.4 | 20.2 | 20.7 | 16.0 | 15.9 | 14.4 | 12.9 | 12.2 | 10.9 | 10.7 | 8.9 |
| Mississippi | 20.0 | 18.3 | 18.2 | 17.7 | 23.9 | 24.5 | 24.3 | 21.7 | 18.6 | 19.0 | 16.8 | 14.1 | 12.3 | 10.5 | 10.1 | 9.9 |
| South Carolina | 18.7 | 21.0 | 22.5 | 22.2 | 20.5 | 22.7 | 19.0 | 19.7 | 17.7 | 13.9 | 14.7 | 15.6 | 13.7 | 13.1 | 12.9 | 11.6 |
| Tennessee | 15.8 | 18.4 | 16.5 | 16.7 | 17.3 | 16.7 | 15.4 | 14.4 | 15.1 | 13.0 | 12.4 | 12.5 | 10.2 | 8.9 | 8.3 | 6.9 |
| Region 7—Total | 11.7 | 12.7 | 12.6 | 14.3 | 12.6 | 12.5 | 11.5 | 11.6 | 11.2 | 10.2 | 10.3 | 9.7 | 9.6 | 8.5 | 7.9 | 6.8 |
| Iowa | 10.5 | 11.7 | 8.8 | 10.5 | 9.8 | 8.0 | 8.0 | 7.0 | 8.7 | 7.8 | 7.6 | 8.2 | 6.8 | 6.1 | 6.5 | 5.5 |
| Kansas | 11.8 | 12.0 | 14.0 | 13.7 | 12.1 | 13.5 | 12.8 | 11.8 | 12.2 | 10.4 | 10.1 | 9.5 | 10.4 | 7.6 | 7.6 | 6.2 |
| Missouri | 16.5 | 18.0 | 18.6 | 21.9 | 19.0 | 18.4 | 16.8 | 18.1 | 15.2 | 13.6 | 14.4 | 13.1 | 13.8 | 12.1 | 10.6 | 9.4 |
| Nebraska | 8.3 | 8.3 | 8.2 | 9.7 | 8.4 | 9.0 | 6.8 | 7.8 | 7.3 | 9.0 | 7.5 | 6.7 | 5.5 | 6.5 | 6.3 | 5.3 |
| North Dakota | 4.2 | 5.3 | 5.8 | 6.0 | 4.8 | 5.0 | 5.6 | 4.2 | 5.8 | 4.1 | 5.0 | 4.3 | 4.9 | 5.4 | 3.0 | 2.9 |
| South Dakota | 4.1 | 6.2 | 4.3 | 5.3 | 4.3 | 7.1 | 6.2 | 5.6 | 6.7 | 5.9 | 5.6 | 6.1 | 5.6 | 4.9 | 5.9 | 5.4 |
| Region 8—Total | 16.1 | 17.4 | 16.9 | 17.2 | 17.1 | 17.0 | 16.0 | 16.5 | 13.9 | 12.9 | 12.6 | 12.1 | 11.7 | 10.4 | 10.2 | 9.3 |
| Arkansas | 13.0 | 12.6 | 11.5 | 14.4 | 15.2 | 16.3 | 16.4 | 13.5 | 12.1 | 11.2 | 10.3 | 9.9 | 10.4 | 7.9 | 10.4 | 7.6 |
| Louisiana | 31.0 | 33.7 | 32.3 | 28.7 | 28.4 | 27.6 | 27.3 | 29.2 | 23.0 | 21.3 | 19.3 | 20.2 | 19.3 | 16.7 | 16.0 | 15.6 |
| New Mexico | 14.6 | 17.5 | 16.0 | 15.9 | 17.7 | 17.9 | 17.2 | 14.6 | 11.1 | 10.1 | 14.2 | 9.6 | 12.4 | 14.5 | 10.2 | 11.0 |
| Oklahoma | 9.9 | 11.9 | 11.8 | 13.4 | 12.5 | 13.8 | 11.8 | 12.2 | 11.5 | 9.1 | 10.1 | 9.1 | 8.0 | 8.6 | 7.8 | 7.2 |
| Texas | 14.1 | 15.0 | 15.0 | 15.4 | 15.1 | 14.5 | 13.1 | 14.4 | 12.1 | 11.6 | 11.6 | 10.8 | 10.5 | 9.2 | 8.8 | 8.0 |
| Region 9—Total | 10.3 | 13.4 | 12.0 | 12.8 | 13.5 | 11.9 | 11.7 | 10.1 | 10.2 | 9.3 | 8.7 | 9.2 | 8.3 | 7.4 | 7.2 | 6.6 |
| Colorado | 12.8 | 16.0 | 14.5 | 17.3 | 19.5 | 15.6 | 14.6 | 11.9 | 12.7 | 12.4 | 11.6 | 8.7 | 9.2 | 9.3 | 9.9 | 8.8 |
| Idaho | 6.6 | 9.1 | 5.3 | 6.8 | 7.3 | 6.9 | 9.5 | 8.0 | 5.6 | 5.4 | 3.7 | 5.4 | 4.8 | 3.6 | 3.8 | 3.2 |
| Montana | 11.1 | 18.1 | 15.2 | 14.5 | 14.1 | 13.9 | 13.2 | 11.8 | 11.0 | 11.2 | 9.2 | 15.7 | 12.1 | 9.8 | 9.6 | 7.6 |
| Utah | 6.3 | 9.0 | 10.6 | 8.0 | 6.1 | 6.9 | 5.3 | 4.9 | 6.0 | 5.0 | 5.1 | 4.9 | 4.5 | 4.7 | 3.4 | 4.5 |
| Wyoming | 13.1 | 9.1 | 10.2 | 11.3 | 14.9 | 12.2 | 14.1 | 14.5 | 15.7 | 10.4 | 14.0 | 18.3 | 13.5 | 8.7 | 6.8 | 7.7 |
| Region 10—Total [2] | 20.8 | 18.7 | 19.5 | 19.7 | 20.0 | 19.0 | 18.3 | 16.7 | 15.6 | 14.0 | 13.3 | 12.3 | 11.5 | 9.7 | 9.1 | 7.7 |
| Arizona | 15.6 | 17.5 | 21.8 | 19.4 | 18.1 | 19.6 | 22.5 | 21.7 | 14.3 | 11.1 | 10.7 | 13.4 | 14.7 | 10.9 | 9.9 | 8.9 |
| California | 22.9 | 20.0 | 20.6 | 21.4 | 21.1 | 20.4 | 19.5 | 17.8 | 16.9 | 15.4 | 14.4 | 12.9 | 12.3 | 10.2 | 9.7 | 8.4 |
| Nevada | 14.4 | 17.2 | 19.8 | 27.4 | 21.2 | 26.4 | 13.0 | 18.8 | 28.8 | 14.5 | 20.4 | 18.1 | 12.9 | 16.5 | 13.7 | 9.1 |
| Oregon | 18.4 | 13.5 | 16.5 | 15.1 | 15.1 | 12.3 | 14.7 | 12.0 | 11.6 | 10.9 | 9.5 | 10.8 | 8.3 | 8.4 | 6.9 | 6.1 |
| Washington | 16.3 | 16.9 | 16.3 | 15.7 | 19.3 | 17.1 | 15.1 | 13.7 | 12.5 | 11.2 | 11.3 | 10.4 | 8.7 | 8.1 | 7.6 | 5.4 |
| Total continental United States | 15.1 | 15.9 | 15.4 | 16.2 | 16.1 | 15.9 | 15.0 | 14.4 | 13.3 | 12.2 | 12.1 | 11.3 | 10.7 | 9.3 | 8.8 | 8.0 |

---

[1] 1933–41, place of occurrence, 1942–48, place of residence.

[2] Continental United States only.

Source: Mortality data from National Office of Vital Statistics; population data from the Bureau of the Census; regional rates computed by the Division of Venereal Disease. FSA-PHS—Division of Venereal Disease, Office of Statistics, 12-8-50 (MRB:AS/mb).

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# Reinfections Following Routine Metal Therapy of Early Syphilis[1]

**Evan W. Thomas, M. D., and Simeon Landy, M. D.**

It is now well recognized that reinfec-ons following rapid therapy of early yphilis are relatively frequent. How-ver, the impression still persists among iany physicians, including some experi-nced syphilologists, that reinfections llowing the older methods of prolonged etal therapy of early syphilis were very are. The persistence of such an errone-us impression is due to the teachings of e older textbooks on syphilis and to the gid criteria which had to be met before e diagnosis of reinfection could be ccepted. In 1928 Halley and Wasser-ann (*1*) analyzed 676 cases of presumed einfections reported in the literature nd found only 229 to be acceptable as einfections. The reports of the Cooper-tive Clinical Group supported the opin-on that reinfections were rare. Their eports were chiefly concerned with re-pses and not with possible reinfections. n 1931 (*2*) they classified only 40 as pposed reinfections among 5,952 early ses, and most well-trained syphilol-gists, up to the introduction of rapid erapy for early syphilis in the late 930's, were extremely skeptical of a iagnosis of reinfection. By the old cri-eria, even a new chancre was not accept-ble proof of reinfection unless the patient as seronegative when examined and bsequently became seropositive or de-eloped secondary lesions. Even when ese rigid criteria were met, there was ways doubt as to the accuracy of the istory. In this vein, Stokes, in 1934, ays, ". . . in my opinion, no irrefran-ible clinical entity of second infection ith syphilis has been established" (*3*).

In retrospect we can now realize how ctually misleading it was to demand iteria of reinfection which were seldom lfilled and which left a relatively large number of cases unclassified or misclassified. A new chancre appearing at a different site from the original one should always have been presumptive proof of reinfection. It has been known since the 1920's that, following treatment of experimental primary syphilis, rabbits in many instances could be reinfected, with the development of a new chancre, provided treatment was given within 90 days following the appearance of the original chancre (*4*). It has also been known for many years that some cases of early syphilis in human beings were cured by relatively small amounts of arsenical drugs (as little as five or six injections in several cases and followed up by us for years). Consequently, reinfection might have occurred in some patients after a therapy that would have been inadequate for the majority of cases of early syphilis.

Prior to the introduction of rapid treatment, these and other possibilities were lost sight of due to the almost universal opinion that reinfection following the older methods of therapy was improbable. Since the introduction of rapid therapy our views regarding the frequency of reinfection have been radically changed. We now know that reinfections following rapid treatment of early syphilis have been almost as frequent as relapses, if not more so. Rapid therapy, however, has not significantly altered the immunology of syphilis. Reinfections *during* prolonged treatment of early syphilis were undoubtedly extremely rare, but they occurred much more frequently *after* the completion of treatment than was realized.

To prove this statement, we recently reviewed the records of about 8,000 patients who had been given some form of rapid treatment for early infectious syphilis at Bellevue Hospital since December 1939. We found records of 311 patients who gave definite histories of previous antisyphilitic treatment with prolonged metal therapy. The number of injections was not always remembered and very often, when the patient gave the number of injections, the accuracy of the information was questionable. Nevertheless, we included no cases where there was any doubt in the patient's mind that he or she had been previously treated for syphilis with the older methods of prolonged therapy. In most cases we made no effort to confirm the history because it is most unlikely that a patient would give a history of antisyphilitic treatment unless it had been received.

---

[1] From the Rapid Treatment Center, Belle-e Hospital, New York, N. Y.

Most of the 311 patients with histories of previous routine treatment remembered having had early lesions at the time treatment was started. Those who did not recall having lesions probably had early syphilis of less than 2 years' duration at the onset of therapy. We have only one proved exception to this probability—a patient who first received treatment for cardiovascular syphilis 15 years after infection and who subsequently developed a darkfield-positive chancre. His original treatment started in 1935 and was continued to 1943. In 1944 he had negative serologic tests for syphilis, and in 1945 he developed seropositive, darkfield-positive primary syphilis. This unusual exception was previously reported by us (*5*). In the present series there are some 20 additional patients who insisted that they were originally treated only because of "bad blood" and we had no means of knowing the duration of syphilis when the original treatment was started. It is possible that some of these patients were originally treated because of biologic false-positive tests. However, regardless of the accuracy of the histories regarding the amount of treatment and the duration of syphilis when the older schedules of metal therapy were started, we have no doubt that all of the 311 patients had received at least some previous treatment with the older methods of metal therapy.

The task of differentiating between reinfection and relapse in all of the 311 cases is admittedly difficult and we make no claim of absolute accuracy. To t
best of our judgment we have classifi
them according to the most plausib
probability. Most of those classified
reinfections gave a history of previo
therapy more than 2 years before t
appearance of new lesions and, with
few exceptions, all gave histories of ha
ing obtained a negative serologic te
for syphilis following previous treatme
more than 6 months prior to the reinfe
tion. The exceptions to the latter ru
are patients given the 6-month routi
metal therapy in the armed forces. S
such patients who had received trea
ment less than a year prior to probab
reinfection had new chancres when a
mitted to our service and all but o
were seronegative on discharge from t
armed forces. All patients in the seri
who had primary lesions at the time
rapid therapy were classified as rei
fections; 98 such cases of unquestion
reinfections are included.

In addition to these 98 patients wi
new chancres, 117 others were consider
reinfections, making a total of 215. T
remaining 96 of the 311 patients we
classified as relapses. It is quite possib
that some cases counted as relapses we
actually reinfections.

Of even more interest than the numb
of probable reinfections after previo
routine metal therapy is the duration
time between previous therapy and t
development of new infectious lesio
Table 1 gives the number of probab
reinfections occurring in various perio
after previous therapy. The table sho
that, according to the patients' histori
all but 32 of those with probable re
fections received routine metal thera
more than 2 years prior to the appea
ance of new lesions. Most of the
patients who were treated less than
years previously had been treated wh
in the armed forces and were seroneg
tive on discharge from the milita
services.

Table 2 shows the number of patien
with new primary lesions at various p
riods following previous prolonged me
therapy. One patient with a new chanc

**able 1.—*Patients with probable reinfections at stated intervals following previous routine metal therapy for syphilis***

| me prior to re-treatment when routine metal therapy was received | Number of patients |
|---|---|
| ss than 1 year | 6 |
| 2 years | 27 |
| 3 years | 42 |
| 4 years | 31 |
| 5 years | 26 |
| 10 years | 53 |
| to 15 years | 17 |
| o 20 years | 8 |
| o 25 years | 4 |
| to 30 years | 1 |
| Total | 215 |

**ble 2.—*Patients re-treated for new chancres following previous routine metal therapy for syphilis***

| me prior to re-treatment when routine metal therapy was received | Number of patients |
|---|---|
| s than 1 year | 6 |
| 2 years | 17 |
| 3 years | 24 |
| 4 years | 12 |
| 5 years | 7 |
| 10 years | 18 |
| o 15 years | 9 |
| o 20 years | 3 |
| o 25 years | 1 |
| o 30 years | 1 |
| Total | 98 |

1945 was treated for early syphilis ile in the Army during World War I. the 98 patients with new chancres, ad seronegative primary syphilis and but 23 gave histories of previous rou- e metal therapy more than 2 years ior to the development of a new ancre. Thus, it is obvious that some tients treated for early syphilis can reinfected at any time after successful rapy.

The surprising fact is that more rein- tions are not seen many years after atment. Probably most individuals less sexually promiscuous as they vance in years, but this probability ne cannot account for the failure to serve more reinfections. Apparently ny patients develop sufficient immu- y during the early stages of the disease prior to treatment to prevent reinfection by a few spirochetes; others fail to develop adequate resistance to reinfection. Whatever the reason for the failure to observe *more* reinfections, the data reported above prove that reinfections following prolonged metal therapy are not particularly rare.

More than half of the patients classified as reinfections did not have new chancres but some of them gave definite histories of exposure to patients with early syphilis and all of them claimed to have been seronegative at some time following routine treatment and prior to the development of new lesions. Furthermore, the time elapsing between routine metal therapy and the development of new infectious lesions favors reinfection rather than relapse. To assume relapse in previously treated patients who subsequently develop only secondary lesions is contrary to our clinical experience. It is well known that many patients with original infections never had an observed chancre, and there is no doubt in our minds that reinfections following the older schedules of metal therapy were more frequent than previously realized.

## Summary

1. Of about 8,000 patients who received rapid treatment for early infectious syphilis at Bellevue Hospital since December 1939, 311 gave definite histories of previous routine metal therapy, the great majority having received prolonged treatment for at least 6 months.

2. Of the 311 previously treated patients, 215 were classified as reinfections, 98 having had new chancres at the time of re-treatment.

3. On the basis of histories given by the patients, reinfections have occurred more than 25 years after previous routine treatment of early syphilis.

4. The numbers of probable reinfections occurring at stated intervals after previous prolonged metal therapy are listed in table 1, and the numbers of almost certain reinfections (new chancres) occurring at stated intervals after previous therapy are listed in table 2.

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# Cisternal Puncture for Examination of Cerebrospinal Fluid[1]

**Howard L. Cecil, M. D., and Edgar B. Johnwick, M. D.**

The routine performance of cisternal puncture for examination of cerebrospinal fluid was adopted at this Medical Center on April 7, 1945, and was discontinued on April 26, 1950. Five years of experience with this procedure represent 44,711 cisternal punctures performed by eight operators. This paper is a review of the reasoning that preceded the adoption of the cisternal puncture and the observations and impressions that led to the decision to abandon it.

The main reason for adopting the cisternal puncture was to prevent deaths from neurosyphilis. Before April 1945, the United States Public Health Service Medical Center was treating about 400 persons each year for central nervous system syphilis. However, it was calculated that some 120 persons failed to return each year because of fear of subsequent spinal punctures, and that among these there were about 40 potential treatment failures who would benefit from retreatment. Recognition was given to the hazard of cisternal puncture, but the hazard of untreated neurorelapse was presumed to be greater. In the Medical Center all syphilitic patients admitted were subjected to lumbar puncture, and approximately 25 percent of all patien experienced a severe to moderately s vere headache lasting from 1 to 3 day These personal experiences were reto by the patients with missionary zeal, ar the lumbar puncture stood alone as th most unpopular procedure practiced the management of syphilis. It was log cal to deduce that this unpleasant ass ciation was largely responsible for po follow-up in those patients who ha neurosyphilis. It had been noted b others (*1*, *2*, *3*) that cisternal punctur although accompanied by danger, wa seldom followed by headache.

The technic employed for cistern puncture was almost identical with th described by Spiegel (*4*), the differen being in the needle employed here. Th was a 19- or 20-gage needle, 2 to 2 inches long. The patient was laid on th right side with the head sharply flex forward and firmly held by a nurs Folded sheets were used for a pillow that the cervical spine was horizontal the table. When the first vertebra cou be felt, the needle was inserted immed ately above it. Usually the spinous pro ess of the second vertebra was locat and the puncture made in the depressi just above that. The needle was int duced toward the midpoint of an imag nary line joining the outer canthi of the eyes. The depth of the puncture was determined entirely by "feel," entry into the cisterna being signaled by a decrease in resistance to the advancing needle. This end point is difficult to describe, it being more accurate to say that the operator feels "as if the needle is about to go through." At that point the stylet was removed and 8 ml. to 10 ml. of cisternal fluid withdrawn with a 10-ml. syringe.

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[1] From the U. S. Public Health Service Medical Center, Hot Springs National Park, Ark.

The first 9,000 cisternal punctures were reviewed carefully as to reactions which, few as they were, were found to decrease in frequency as skill in the procedure was gained. Among the first 9,000 cases there were five postpuncture headaches so vaguely described by the patients that they were hardly considered noteworthy by the observers. However, 25 other patients experienced a sequence of symptoms and signs that were undoubtedly caused by subarachnoid hemorrhage. The pattern was: headache within 2 hours and mild dizziness followed by stiffness of the neck muscles. Typically, backache occurred as the headache began to recede. Five of the twenty-five patients were nauseated and three of these vomited. Several had fever (100° F. to 102° F.). A few had a marked slowing of the pulse. Subsequent lumbar puncture in some reaction cases showed xanthochromic or bloody spinal fluid. Those 25 patients who showed signs of subarachnoid hemorrhage were kept in bed and given sedation until the symptoms subsided. The duration of symptoms was from 1 to 21 days, the average being 8 days. Almost all the original 9,000 patients in this review had been observed for at least a week after the withdrawal of cisternal fluid, and it was felt by the staff that few reactions had escaped notice. This low figure of 0.26 percent postpuncture reactions encouraged the staff to continue with this procedure. It was also notable that patient attitudes had changed. Those patients who had experienced both a lumbar and a cisternal puncture preferred the latter. Those patients who had submitted to a cisternal puncture for the first time without suffering any ill effects (99.74 percent of all examined) passed the word along to newly admitted patients who were to be examined a day or so later. Fewer than 3 patients per 1,000 examined were dissatisfied with this new procedure, whereas formerly there had been 250 patients per 1,000 examined to warn the newcomers as to what lay head of them. At the same time, increased stress was placed on returning patients for follow-up, and the return of patients for reexamination made significant progress thereafter.

Several observations and impressions marred these satisfactory conditions. It was soon learned that all newly arriving staff members could not learn the technic of cisternal puncture, for which a certain combination of manual dexterity and delicate tactile sense was necessary. It was also decided that patients with hypertension or arteriosclerosis were unsuitable for cisternal puncture. And, in spite of the prevailing optimism that cisternal puncture was more popular among patients than lumbar puncture, there was still a small group of patients who were afraid of a procedure that required insertion of a needle at the base of the skull. Experience showed that those patients who said they were afraid or who held themselves tense during the examination were more likely to have untoward reactions. Fear, therefore, became one of the primary contraindications to cisternal puncture.

During the 5 years of experience with cisternal puncture, there were 4 deaths among the 44,711 patients. The first death occurred after more than 12,000 punctures had been performed with fewer than 40 reactions; the second death followed over 4,000 additional examinations; the third death occurred after another 13,000 cisternal punctures; and the fourth death occurred following about 18,000 more cisternal punctures. The procedure was then abandoned. It is pertinent to note that these four fatal reactions were distributed, one each, among four experienced examiners. Case reports of the 4 deaths follow:

*Case 1.*—A white male, aged 33 years, with a gumma of the soft palate which had healed after treatment, returned for a check-up examination. Previous cerebrospinal fluid examination was negative. When the cisternal puncture was done, a drop of blood appeared in the needle hub, and the needle was withdrawn. The patient immediately developed convulsive movements of the hands and jaw and began to sweat profusely. The breathing became stertorous. The pulse was 54, respirations were 16, and the blood pressure was 178/88. He vomited gastric contents within 15 minutes, and became semicomatose. The pulse was 40, the respirations were 18, and the blood pressure was 177/108. The patient expired in 1 hour and 20 minutes. Treatment had consisted of sedation, nasal oxygen, and artificial respiration. No autopsy was granted.

*Case 2.*—A Negro female, aged 45 years, was admitted for the first time with a positive serologic test for syphilis found elsewhere. Our serologic test showed 32 Kahn units. A cisternal puncture was done, but the needle was withdrawn because blood appeared. After 4 hours the patient complained of a slight headache. The pulse was 86, respirations were 18, and the blood pressure was 120/100. She was very drowsy. At 14 hours after the puncture, she developed convulsive movements of the hands, arms, and shoulders and became comatose. At 24 hours a lumbar puncture was performed and 10 cc. of blood-tinged fluid removed. The pulse was 92, the respirations were 24, and the blood pressure was 134/88. At 48 hours another lumbar puncture was done and 15 cc. of bloody fluid removed; the patient became more responsive, and convulsive movements diminished. The blood pressure remained unchanged, but respirations had risen to 40 and the pulse to 130. The temperature began to rise gradually at 24 hours and continued to rise until the patient expired at 86 hours with a temperature of 107.9° F. Treatment had consisted of sedation, vitamin C, Synkamin intravenously, two intravenous infusions of 10-percent glucose (500 cc. each), and oxygen through a nasal tube. No permission for autopsy was granted.

*Case 3.*—A Negro male, aged 27 years, was admitted with a history of a penile lesion 7 months previously. One month before admission the patient had had a positive blood test but had not received any treatment. Physical examination showed a blood pressure of 150/90, a pulse rate of 60, and a blowing systolic murmur, heard best in the second right interspace. The serologic test for syphilis showed 256 Kahn units. A cisternal puncture was done, but the needle was withdrawn immediately because blood was obtained. The patient was put to bed and was found to be completely without symptoms for 2 hours following the puncture. He then suddenly developed profuse sweating, headache, nausea, and vomiting. At this time the pulse was 60 and of good quality, and the blood pressure was 220/110. The patient then became comatose. A lumbar puncture was performed, and 20 cc. of bloody spinal fluid removed. The blood pressure was 115/100, the pulse was 40, and the respirations were labored and irregular. Coramine (3 cc.) was given, and he showed signs of improvement. The pulse became regular, the rate increasing to 60, and the blood pressure was 120/90. The patient responded to questions. Another lumbar puncture was performed and 18 cc. of bloody spinal fluid removed. Twelve hours following the cisternal puncture, the pulse increased to 120, the respirations became labored, and the patient failed to respond to further injections of Coramine, expiring 13 hours following the cisternal puncture. Permission for autopsy was not granted.

*Case 4.*—A 25-year old Negro male was admitted to the Medical Center with a darkfield-positive penile lesion. The serologic test for syphilis showed 128 Kahn units, and a cisternal puncture was obtained which showed normal findings. There was no difficulty in obtaining this fluid, which contained neither gross nor microscopic blood. Approximately 24 hours after the cisternal puncture the patient came to the hospital complaining of headache and stiffness in the back. He was admitted, given 2 gr. of sodium luminal, and put to bed. The pulse was 70, the respirations were 22, and the blood pressure was 130/90. He continued to complain of a very severe headache, and at 48 hours a lumbar puncture was performed, 10 cc. of grossly bloody fluid being removed. He felt more comfortable thereafter but became restless again after a short interval. At 72 hours the temperature began to rise. The pulse became more rapid, and the respirations increased. The patient expired 84 hours after the cisternal puncture. At this time his temperature had risen to 105° F., the pulse, to 160, and respirations, to 32. The blood pressure shortly before death was 156/106. The patient had been treated with Seconal and paraldehyde for sedation during his hospital stay and had received 20 cc. of 50-percent glucose shortly before his death. No permission was granted for an autopsy.

Because the cisternal puncture replaced the lumbar puncture in order to improve follow-up and thereby to reduce deaths from neurosyphilis, it is necessary to examine the effect of lumbar and cisternal puncture on follow-up. Two groups of patients were chosen for study, each consisting of 250 consecutive admissions found to have neurosyphilis. Recorded was the number of times that these patients returned for one or more reexaminations during 1 year from the time of their original admission; also recorded was the number of patients re-treated as a result of these reexaminations. Since cisternal punctures were adopted in April 1945, the lumbar puncture sample was taken beginning in April 1943. The cisternal puncture sample was taken beginning in April 1946 after operative skill had been acquired and the method had been introduced to the patients. Over 5,000 cisternal punctures had been performed by that time. In order to equalize follow-up possibility, only those patients residing in Arkansas, Louisiana, Texas, Oklahoma, Missouri, Tennessee, and Mississippi were counted. This was necessary because prior to 1945 more patients from distant States were being sent to Hot Springs. The findings are shown in tables 1, 2, and 3.

**Table 1.**—*Number and percent of patients returning for follow-up within 1 year after original lumbar or cisternal puncture*

| Procedure | Number of original patients | Number of patients returning | Percent of patients returning |
|---|---|---|---|
| Lumbar puncture | 250 | 70 | 28 |
| Cisternal puncture | 250 | 177 | 71 |

**Table 2.**—*Number and percent of patients re-treated following lumbar or cisternal puncture*

| Procedure | Number of patients reexamined | Number of patients retreated | Percent of patients retreated |
|---|---|---|---|
| Lumbar puncture | 70 | 5 | 7.1 |
| Cisternal puncture | 177 | 15 | 8.5 |

**Table 3.**—*Ratio of repunctures to retreatments in patients examined by lumbar or cisternal puncture*

| Procedure | Number of repunctures | Number of retreatments | Ratio |
|---|---|---|---|
| Lumbar puncture | 77 | 5 | 15.4:1 |
| Cisternal puncture | 353 | 15 | 23.5:1 |

Of 250 patients with neurosyphilis whose examination included lumbar puncture, 70 returned for one or more examinations. Of this number, 7 returned for 2 repunctures within 1 year. These 70 patients made a yearly return rate of 28 percent (table 1). Of the 70 persons reexamined, 5 were re-treated, making a yearly total re-treatment rate of 7.1 percent (table 2). The ratio of the 77 total lumbar repunctures to re-treatments in 1 year was 15.4:1 (table 3).

Of 250 patients with neurosyphilis whose examination included cisternal puncture, 177 returned for one or more examinations; 129 came back two or more times; and 47 of these came back 3 times for a repuncture in a 1-year period. The 177 patients made a total yearly return rate of 71 percent (table 1) and received 353 diagnostic repunctures. Of the 177 persons reexamined one or more times, 15 were re-treated, thus giving a yearly total re-treatment rate of 8.5 percent (table 2). The ratio of the 353 cisternal repunctures to re-treatments was 23.5 : 1 (table 3).

## Discussion

1. Although no autopsies were granted in any of the four deaths reported, we believe that there is adequate clinical evidence to indicate that subarachnoid hemorrhage was the cause of death in each case. The size, name, and location of the vessel that bled in each case is not known. Even the nature of injury to the vessel is not known. The vessel may have been lacerated by the point of the needle, or it may have burst when the surrounding fluid in the cisterna magna was removed. It is likely that minute injuries to small vessels occurred from time to time, such as in the 25 cases cited among the first 9,000 cisternal punctures. The area is very well supplied with small blood vessels. The larger arteries that may have been accidentally pierced are the posterior spinal or the posterior inferior cerebellar branches of the vertebral artery. Dandy (*5*) reports the presence of the cerebellar tonsils in the cisterna magna in one patient who experienced an intracranial hemorrhage following cisternal puncture. Apparently, in that case, the needle lacerated the plexus of small vessels covering the cerebellar tonsil. It is also likely that aberrant larger blood vessels are present in the cisterna magna or its coverings and that an operator will strike one of these aberrant vessels if his series of punctures is large enough. Whatever the explanation, it appears to be clear that no amount of skill, training, and preliminary precaution will prevent the appearance of these tragic accidents.

2. At the United States Public Health Service Medical Center, 19,833 lumbar punctures have been performed without a single fatality attributable to the procedure. It is true that an estimated 4,890 headaches were caused. However, in comparison, 1 out of every 11,000 cisternal punctures resulted in a fatality.

3. The lumbar puncture follow-up of 250 treated cases of neurosyphilis resulted in a 2-percent re-treatment rate in 1 year. The cisternal puncture follow-up of 250 treated cases of neurosyphilis resulted in a re-treatment rate of 6 percent in 1 year. Is it worth while to increase the re-treatment rate in treated neurosyphilis from 2 percent to 6 percent by subjecting the patients to an examination procedure which has a fatality rate of 1 in 11,000? During the entire experience with cisternal punctures 4 patients died as a result of the examination procedure and none died as a result of the disease.

## Summary

1. A review is presented of 44,711 diagnostic cisternal punctures performed in a period of 5 years.

2. Four fatalities attributable to cisternal punctures are reported.

3. No sufficient justification was found for using the cisternal puncture, even in skilled hands, either as a diagnostic procedure in syphilotherapy or as a device for increasing follow-up among patients with neurosyphilis.

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# A New Approach to Venereal Disease Education at Michigan Fairs

**John A. Cowan, M. D., M. S. P. H.**[1]

In planning the 1950 version of the venereal disease tent show to be presented at Michigan fairs during August and September, the Michigan Department of Health obtained, without cost, the advice of a consultant in national advertising and industry training. His expert recommendations can be summed up in these words: "Make it easy to see and put it where people are sure to see it." It remained for the venereal disease control staff to work out the thousand and one details of an educational device that would meet these broad specifications.

In Michigan, we feel that our annual tent show is our most important single activity in venereal disease education. Only on the midways of the fairs is there an opportunity to present venereal disease information to large audiences of people from all walks of life. When the decision to undertake an educational program at fairs was first made, it was based on a belief that among patrons of the fairs are many persons to whom venereal disease information can be presented profitably. We believe that there is no absolute yardstick for measuring the effectiveness of venereal disease education. Assuming, however, that our exhibit presents venereal disease information clearly and simply, we feel that the number of persons exposed to this information can be considered indicative of the success or failure of our educational program.

Our experience in showing movies at the fairs in two previous years indicated that (1) the number of persons reached by film showings was too limited; and (2) that movies on venereal disease, in order to be acceptable for showing to the general public, pulled too many punches. The answer to these drawbacks, we felt, would be to show, instead of films, a walk-through type of medical exhibit with a front that would appeal to thirst for sex information. In order to eliminate the objection that many people have to venereal disease shows for mixed audiences, we planned two exhibit sections, to be set off by large signs: "ENTRANCE—MEN" and "ENTRANCE—WOMEN."

An important consideration in the final decision to use a portable exhibit as a means of presenting venereal disease facts was that such an exhibit would lend itself to use throughout the year. It could be set up at large meetings, conventions, and indoor expositions as a part of local health department venereal disease control programs. Thus, funds expended in developing an educational device for use at the fairs would provide educational material for use on many other occasions.

The exhibit, entitled "Since Adam and Eve" (fig. 1), was housed in a tent, 20 by 40 feet, which we already owned. To carry out the theme of the title, and to provide an additional attraction for the front, two dioramas were set up outside the tent—one devoted to a scene showing Adam and Eve in the Garden of Eden; and the other, to a modern setting, showing a couple in a car parked by a moonlit lake. Inside the tent were two exhibit sections, one for males and one for females. Each section contained 11 fluorescent-lighted panels which were hung at eye level (fig. 2). On each panel were posters illustrated by color photographs, 8 by 10 inches, of aspects of syphilis and gonorrhea. The panels on syphilis were arranged in sequence to depict the progress of the disease from the appearance of the chancre to the manifestations of late syphilis. An additional feature of the exhibit was a diorama entitled "Corky the Killer," based on the book of the same

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[1] Director, Division of Tuberculosis and Venereal Disease Control, Michigan Department of Health, Lansing, Mich.

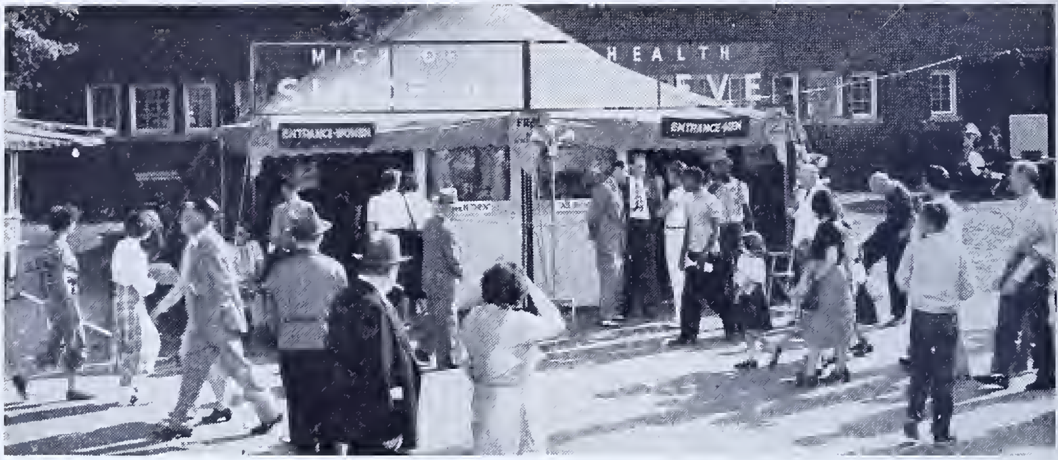

FIGURE 1.—The tent set up where midway crowds were sure to see it.

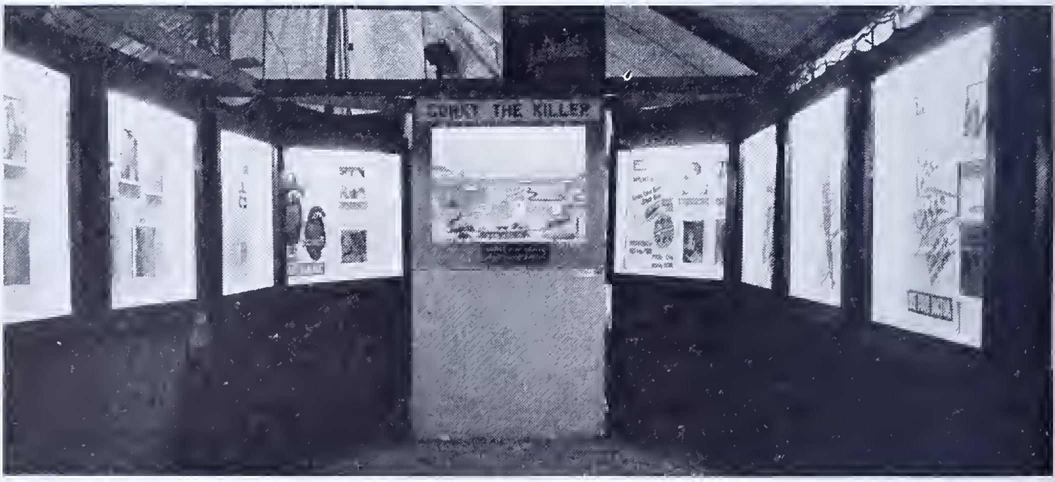

FIGURE 2.—Fluorescent-lighted panels hung at eye level.

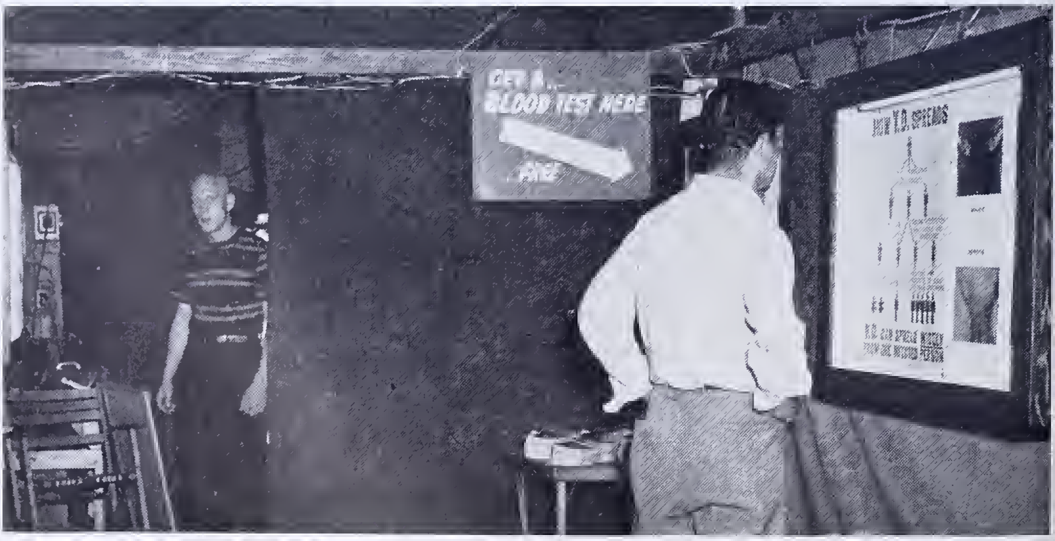
GET A BLOOD TEST HERE
FREE
HOW V.D. SPREADS

FIGURE 3.—Free blood tests were offered to patrons of the fairs.

title by Dr. Harry A. Wilmer (*1*). In the book, the course of the spirochete through the human body is traced by means of a series of whimsical drawings.

The advertising consultant advised selection of a single publication, "Out in the Open" (*2*), for distribution at the tent show. Instead of handing out booklets, as we had done in previous years. we placed copies on tables under a "FREE—TAKE ONE" sign. We believe that the 43,000 pamphlets that were picked up this year represent quality distribution. Twenty-eight percent of the people who saw the exhibit took booklets out with them.

Total attendance at the exhibit at 8 fairs was estimated at 155,585 persons. This compares with 23,000 persons, by actual count, who attended our tent show at 8 fairs in 1948 (*3*), and with 34,000 persons, by actual count, who attended our tent show at 9 fairs in 1949. This is the method used to compute this year's attendance: An actual count of persons who attended the exhibit was taken for 10 minutes of each hour; this figure was multiplied by 6 to obtain an attendance figure for the hour; the attendance figures for each hour were added to obtain total attendance for the day.

Venereal disease educational movies were shown in 1949 at five of the same fairs at which the exhibit was shown in 1950. Attendance figures for 1949 and 1950 are compared in table 1.

**Table 1.**—***Comparison of attendance at venereal disease film showings with attendance at venereal disease exhibit***

| Fair | Film showings 1949 | Exhibit 1950 | Percent of increase |
|---|---|---|---|
| Barry County Fair (Hastings) | 1,288 | 8,050 | 525 |
| Ionia Free Fair (Ionia) | 2,804 | 22,900 | 717 |
| Upper Peninsula State Fair (Escanaba) | 2,717 | 8,000 | 194 |
| Michigan State Fair (Detroit) | 15,117 | 90,000 | 495 |
| Saginaw County Fair (Saginaw) | 2,865 | 7,000 | 144 |
| Total | 24,791 | 135,950 | 448 |

The increase in attendance at this year's exhibit in comparison with attendance at movies at the fairs in previous years is attributed chiefly to the facts that no waiting was required to see the exhibit, and that, because of arrangements to pay for space, the exhibit was generally located where midway crowds were sure to see it. The exhibit was shown at the following fairs in addition to the ones listed in table 1: Bay County Fair at Bay City, St. Joseph County Fair at Centerville, and Hillsdale Fair at Hillsdale.

It is impossible to state a ratio between total attendance at the 8 fairs and attendance at the venereal disease tent show, as official attendance records of the fairs are not yet available. It is estimated, however, that 800,000 persons attended the Michigan State Fair in Detroit, where nearly 90,000 persons saw the venereal disease exhibit. These figures indicate that 1 in 8 persons who attended the Michigan State Fair saw the venereal disease exhibit.

At five of the eight fairs—those in Hastings, Ionia, Escanaba, Detroit, and Centerville—free blood tests were offered, with the approval of the local county health departments and county medical societies (fig. 3). So few persons availed themselves of the opportunity to have a blood test made that is apparent that considerable ground work must be laid in order to promote public acceptance of mass blood testing in Michigan.

Public reaction to the exhibit, and especially to the provision for separate sections for men and women, was generally favorable. Attendance was equally divided between males and females. A valued comment, coming from a field representative of one of the largest national voluntary health associations, was that the exhibit was "the best thing that has been done in health education in a long time." A typical ex-GI reaction was: "This is the same stuff we had in the Army—but *good*." A teacher said: "This information should be a part of our teacher-training program." A stripteaser from one of the "girlie" shows on the midway of the State Fair exclaimed: "It's indecent! It oughta be thrown off the midway!"

To set up and dismantle the exhibit, assist in operation, and transport it from one location to another, required a crew of four men. One of these, a staff member of the Department of Health, served as show manager and barker. In addition, a male registered nurse, also permanently employed by the Department, took blood samples at five fairs. The cost of the Michigan fair project was $11,628. (Of this cost, a major item was $3,221 for the fabrication of four dioramas.) As 155,585 persons saw the exhibit, the cost on the basis of total attendance was 7.5 cents per person.

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# Control Serum in the Serodiagnosis of Syphilis—With Special Reference to Its Use in Standardizing Kahn Antigens[1]

**M. B. Kurtz, D. V. M., and E. M. Hill, M. S.**

The maintenance of a constant level of sensitivity in the standardization of successive lots of Kahn antigen would be simplified by the use of a reference serum of constant reactivity.

The simple expedient of freezing a whole syphilitic serum of known reactivity for use as a reference serum has been tested.

The serum under test was processed in April 1943. Five hundred milliliters of pooled positive and negative serums, which gave a titer of 1:8 (32 Kahn units), were Seitz-filtered. Five-milliliter aliquots were placed in 10-ml. rubber-stoppered bottles and frozen at —50° C. and stored at about —20° C. Before use in comparable tests the serum was thawed at room temperature and heated at 56° C. for 30 minutes. The serum was filtered through ordinary filter paper while hot to remove the lipoids which become insoluble during the freezing process.

During 6 years 38 lots of Kahn standard antigen have been tested with the serum described, using the quantitative Kahn procedure. Seven of these antigens were prepared at Dr. Kahn's laboratory, Ann Arbor; 6, at the Venereal Disease Research Laboratory, Staten Island, N. Y.;[2] and 25, at the Michigan Department of Health Laboratories, Lansing.

Table 1 gives examples of the stability of reactivity of this control serum with 13 of the 38 antigens chosen at random. Nine of these antigens were from the Michigan Department of Health Laboratories; 2, from Dr. Kahn's laboratory; and 2, from the Venereal Disease Research Laboratory. There is a marked uniformity between the quantitative results obtained at any given time with different antigens and upon repeated

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[1] From the Michigan Department of Health, Division of Laboratories.

[2] Now located at the Communicable Disease Center, Atlanta, Ga.

**Table 1.—*Examples of the stability of reactivity of control serum with 13 antigens chosen at random***

| Antigen No. | 1943 | 1944 | 1946 | 1947 | | | 1948 | | | 1949 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Sept. | Jan. | Oct. | Jan. | May | Sept. | Jan. | July | Oct. | Jan. | Mar. | July | Sept. |
| 140 | [1]4 4 ± – | | | | | | | | | | | | |
| 148 | | 4 4 1 – | | | | | | | | | | | |
| 182[2] | | | 4 4 ± – | 4 3 – | 4 4 – | 4 4 – | 4 4 – | 4 3 – | 4 3 – | 4 3 – | 4 4 ± – | 4 4 1 – | 4 4 ± – |
| 191 | | | 4 4 1 – | | | | | | | | | | |
| 199 | | | | 4 2 – | 4 4 ± – | | | | | | | | |
| 202 | | | | | | 4 4 – | | | | | | | |
| 205 | | | | | | 4 3 – | 4 4 – | | | | | | |
| 212[2] | | | | | | | | | 4 4 – | 4 3 – | 4 3 – | 4 4 1 – | 4 4 ± – |
| 214 | | | | | | | | | | | 4 4 ± – | 4 4 ± – | 4 4 – |
| 107B[3] | | | | | | | 4 4 ± – | 4 4 – | 4 4 – | 4 4 – | | | |
| 122B[3] | | | | | | | | | | | 4 4 ± – | 4 4 1 – | 4 4 – |
| 82646[4] | | | | 4 2 – | | | | | | | | | |
| 11547[4] | | | | | | | 4 4 – | 4 2 – | 4 2 – | 4 4 – | | | 4 4 1 – |

[1] The readings 4 4 ± – as in all other readings are the results of the Kahn standard quantitative procedure using a 15 : 1 antigen suspension ratio. The first tube of the recorded results represents the reaction at a 1 : 4 serum dilution.

[2] Reference antigens, Michigan Department of Health.

[3] Reference antigens, Dr. Kahn's Laboratory, Ann Arbor, Mich.

[4] Antigens, U. S. Venereal Disease Research Laboratory, Staten Island, N. Y. (now located at Atlanta, Ga.).

testing of this serum with the same antigen. This is particularly evident in the results on the repeated testing of antigen No. 182 over a period of some 3 years.

Equally uniform results were obtained with the other 25 antigens studied during this period. The results obtained indicate that there has been practically no change in the quantitative reactivity of this control serum over a period of 6 years of constant storage in the frozen state. It would seem to establish the value of such a serum as a tool in maintaining a constant level of sensitivity in newly prepared antigens. Such a control serum is easily prepared and requires no special processing except sterile filtration, storage at subfreezing temperature, and paper filtration after the 30-minute heating period just prior to its use.

### Summary

Data are presented which indicate that results with the syphilitic serum kept for 7 years in a frozen state have shown a highly uniform degree of constancy. The simple process of freezing whole syphilitic serum and storing it in the frozen state is suggested as a satisfactory method for preparation of a stable reference serum in relation to the standardization of different lots of Kahn antigen.

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# A Comparison of Two Methods of Gland Transfer in Experimental Syphilis[1]

Charlotte P. McLeod, Sc. D.,[2] and R. C. Arnold, M. D.[3]

The object of the present paper is to report the results of a comparison of two methods of gland transfer employed in experimental syphilis. The experiment here reported was a preliminary study designed to be one of a series with this purpose in view. Under the conditions of the experiment outlined below, the scrotal-implant method of node transfer was more successful than the testicular-inoculation method.

### Methods

Suspensions of the Nichols strain of *Treponema pallidum* containing approximately five organisms per oil-immersion field were prepared from rabbits with early syphilitic orchitis by mincing the testicles in 10-percent serum broth. Normal male rabbits of mixed breeds were infected by inoculating 0.25 cc. of the suspension into both testicles or scrota. Each animal subsequently developed a characteristic syphilitic lesion which was darkfield positive. After the infections had become latent, the rabbits were treated with crystalline penicillin G in aqueous solution, using a schedule that would result in numerous treatment failures. The total therapy for each rabbit was 88 units per kilogram of body weight, administered intramuscularly every 4 hours for 2 days in 12 equal doses. The penicillin was diluted to contain 32.2 units in 1 cc., the individual dose for the largest rabbit, and was shown to be of this strength upon assay in the laboratory.

Six months after completion of therapy the rabbits were killed and gland transfers were made. Both inguinal and both popliteal nodes were removed from each rabbit, and each node was divided into two approximately equal parts. One-half of each inguinal and each popliteal node was implanted (*1*) into the right scrotal sac of a normal rabbit. A suspension was made of the remaining halves of the two inguinal and two popliteal nodes, and this was inoculated into the right testicle of a second normal animal.

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[1] From the Venereal Disease Research Laboratory, U. S. Public Health Service, Staten Islnad, N. Y., now located at Atlanta, Ga.

[2] Bacteriologist, Syphilis Experimental Laboratory, Chapel Hill, N. C.

[3] Medical Director, Chief, Technical Services Branch, National Heart Institute, U. S. Public Health Service.

In implanting the nodes, a small incision was made in the transfer rabbit at the midline of the abdomen just above the scrotum. Through this opening a long, narrow, subcutaneous scrotal pocket was formed with small hemostatic forceps. The pieces of lymph glands were partially cut through several times with scissors and inserted into the distal end of the pocket. The incision was closed with a skin clip. In making the suspensions, the pieces of nodes were finely minced with scissors and thoroughly macerated in a mortar with the aid of a very small amount of sand, approximately 0.2 gm. The gland tissue was suspended in 1.2 cc. of nutrient broth and centrifuged for 2 minutes at a low rate of speed. One cubic centimeter or more of supernatant was recovered and was inoculated into the testicle of the transfer rabbit. With a team of three workers making the transfers, not more than 5 minutes elapsed between killing the test rabbit and inoculating the two recipient rabbits.

The gland transfers were made during the last week of November 1949 at Staten Island, N. Y., and the transfer rabbits were observed during the four winter months which followed. The temperature of the animal rooms was well under 60° F. during this period. The animals were examined twice weekly and the specificity of lesions which developed was proved by darkfield studies. Fluid was aspirated from the testicle or scrotum, or a small section was excised from scrotal lesions and placed in a drop of saline solution upon a glass slide until the spirochetes emerged from the tissue.

## Results

Lymph nodes were transferred from 40 rabbits by the method described above. Twenty-two of these animals had been infected for 3 months when treated, and 18 had been infected from 5 to 12 months. The results of the transfers on the entire group are illustrated in table 1.

**Table 1.—*Results of gland transfers in rabbits with syphilis of 3 to 12 months' duration***

| Number of rabbits | Implanted in scrotum | | | Inoculated in testicle | | |
|---|---|---|---|---|---|---|
| | Positive | Negative | Died | Positive | Negative | Died |
| 40 | 33 | 7 | 0 | 18 | 19 | 3 |

Thirty-three of forty transfers were positive when glands were implanted in the scrotal sac of the recipient rabbit. Eighteen of thirty-seven surviving transfer rabbits became positive when a suspension of nodes was inoculated into the testicle. The incubation period in the 33 rabbits which developed scrotal lesions was 33 to 74 days, or an average of 40 days. The incubation period in the 18 rabbits which developed testicular lesions was 40 to 67 days, or an average of 44 days.

In the 22 rabbits with syphilis of 3 months' duration, there was no difference in the results obtained by the two methods of transfer. Nineteen of twenty-two transfers were positive by the scrotal-implant method, and 15 of 19 surviving transfer rabbits were positive by the testicular-inoculation method. These results are shown in table 2. In this group of rabbits, one transfer to the

**Table 2.—*Results of gland transfers in rabbits with syphilis of 3 months' duration***

| Number of rabbits | Implanted in scrotum | | | Inoculated in testicle | | |
|---|---|---|---|---|---|---|
| | Positive | Negative | Died | Positive | Negative | Died |
| 22 | 19 | 3 | 0 | 15 | 4 | 3 |

testicle was positive where the corresponding transfer to the scrotum was negative.

Table 3 shows the striking difference in results with the two methods which occurred in the 18 animals with infections of 5 to 12 months' duration. All transfer rabbits survived in this group. Fourteen positive transfers (78 percent) were obtained by scrotal implant, while only three positive transfers (17 percent) were obtained by testicular inoculation. In each case where the scrotum transfer was negative, the corresponding transfer to the testicle was negative.

**Table 3.**—***Results of gland transfers in rabbits with syphilis of 5 to 12 months' duration***

| Number of rabbits | Implanted in scrotum | | | Inoculated in testicle | | |
|---|---|---|---|---|---|---|
| | Positive | Negative | Died | Positive | Negative | Died |
| 18 | 14 | 4 | 0 | 3 | 15 | 0 |

## Discussion

In this study of rabbits with latent syphilis given subcurative penicillin therapy, a significantly larger number of positive gland transfers were obtained by the scrotal-implant method than by the testicular-inoculation method. While similar results were obtained with the two methods in rabbits with infections of 3 months' duration, a striking difference occurred in rabbits with infections of 5 to 12 months' duration. The nodes of the animals with early infections presumably contained a sufficiently large number of spirochetes, or other infectious forms, to produce infection in normal rabbits even by the less critical method of transfer. The nodes of the animals with older infections had apparently decreased in infectivity with the duration of the disease, and were proved infectious only under the most favorable conditions of transplant.

It is possible that the greater success with the scrotal-implant method was due to the fact that in this procedure nodes which had undergone no previous manipulations were transferred, while in the testicular-inoculation method the glands were subjected to processes or an environment which may have been unfavorable to the survival or transfer of the infectious agent. However, the number of negative transfers to the testicle seems too large to be accounted for entirely by the possibility that the organisms were damaged in the process of making the suspensions or by exposure to the suspending fluid; or that the spirochetes were trapped in the small amount of sand and tissue sediment and therefore failed to become inoculated into the recipient rabbit.

A more probable explanation of the results obtained is that the scrotal tissue is a more favorable site for the multiplication of *Treponema pallidum* than the testicle. Evidence of this was obtained in an earlier experiment (*2*) using testicular suspensions of spirochetes which had been stored at —20° C. In this earlier study, aliquot samples of the spirochete suspension were inoculated into the body of one testicle and into the scrotal skin of the other testicle of the same rabbit. Of 13 rabbits which became infected by the frozen spirochetes, all developed scrotal lesions while only 5 developed testicular lesions.

The results of the present experiment suggest that continued study of methods of gland transfer in experimental syphilis would be profitable. Further experiments indicated are investigations of the two factors that probably accounted for the results here obtained. These factors are (*a*) the adverse effect of manipulation upon the infectivity of the glandular tissue, and (*b*) the most favorable site for the multiplication of the infectious agent.

## Summary

The following results were obtained in a group of 40 rabbits with syphilis of 3 to 12 months' duration which were subjected to subcurative penicillin therapy, and 6 months later to gland transfer by two different methods:

1. Thirty-three of forty transfers were positive when nodes were implanted in the scrotal sac of the recipient rabbit. Eighteen of thirty-seven surviving recipient rabbits became infected when a suspension of nodes was inoculated into the testicle.

2. There was no difference in the results obtained by the two methods in 22 rabbits with syphilis of 3 months' duration when treated.

3. A striking difference in results with the two methods was obtained in 18 animals with infections of 5 to 12 months' duration. Fourteen of eighteen transfers were positive by scrotal implant, while only 3 of 18 transfers were positive by testicular inoculation.

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# CURRENT NOTES AND REPORTS

## Fourth Annual VD Symposium Planned for April 24–25

Each spring, for the past 4 years, physicians and laboratory workers have gathered to discuss "Recent Advances in the Study of Venereal Disease." This year the symposium will be held in Washington, D. C., on April 24 and 25. The meetings will be sponsored jointly by the American Venereal Disease Association and the Experimental Therapeutics Study Section of the National Institutes of Health, Public Health Service, Federal Security Agency. Scientific sessions will begin each day at 10 a. m. in the auditorium of the Federal Security Building, Independence Avenue between 3d and 4th Sts. SW. The program includes papers on fundamental biology, epidemiology, and clinical aspects of venereal disease. All persons interested in this branch of medical research are cordially invited to attend.

The annual business meeting of the American Venereal Disease Association will be held at 9 a. m. Wednesday, April 25.

Copies of the program are now available. Abstracts of the scientific papers presented will be published after the meetings. Requests for the program or the abstracts should be addressed to Dr. Frederick W. Appel, Executive Secretary of the Experimental Therapeutics Study Section, Division of Research Grants, National Institutes of Health, Bethesda 14, Md.

## WHO Appoints International Anti-Venereal Disease Commission of the Rhine

An International Anti-Venereal Disease Commission of the Rhine was formally created on January 27 by decision of the World Health Organization's Executive Board at Geneva.

This, the first intergovernmental commission established within the framework of WHO, includes Belgium, France, the Netherlands, and Switzerland. The German Federal Government will be represented by observers. The administrative center for the commission will be at Strasbourg and the Technical and

Medico-Social Secretariat will be established at Rotterdam.

The newly appointed Commission's functions will be to coordinate antivenereal disease services of five Rhine-bordering countries for the benefit of Rhine boatmen, and to establish a network of diagnostic-treatment centers at the principal river ports.

The Commission's services will include medical examination, treatment, and hospitalization in any port regardless of the patient's nationality, the distribution of individual treatment cards, international tracing of infectious contacts, and social services.

Preparatory meetings for the creation of this Commission were held in Geneva in 1949 and in Rotterdam in December 1950.

The Commission will be convened annually, when its activities will be reviewed by the WHO Executive Board.

In expressing its satisfaction at the establishment of the Commission, WHO's Board said that the Rhine Commission—the first of its kind—will be followed by other WHO-sponsored agencies fighting against the spread of venereal diseases along inland waterways and through maritime ports.

# CURRENT LITERATURE

ACTA MED. SCANDINAV., STOCKHOLM

On Reiter's syndrome, with special reference to cardiac complications and familial occurrence of the syndrome. Mogens Trier. Acta med. Scandinav., 138 : 123–128, Suppl. 239, 1950.

Two case histories, a 36-year-old male and a 37-year-old male, are presented in illustration of Reiter's syndrome with cardiac complications. A brother and a brother-in-law of the 37-year-old patient were also afflicted with the syndrome. A brief review of the literature is given.

ACTA OPHTH., COPENHAGEN

Central retinal vein thrombosis and hemorrhagic glaucoma. Poul Braendstrup. Acta ophth., Suppl. 35 : 7–162, 1950.

In this study of the relation between primary glaucoma and central vein thrombosis the writer has, almost exclusively, made use of the casebook materials of the department for eye diseases of the Rigshospital and of the eye department of the Kommunehospital in Copenhagen. Of 39 cases in which seroreaction for syphilis was carried out, all with negative results, one patient presented tabes dorsalis, pyelonephritis, and hydronephrosis, while another suffered from tabes dorsalis and aortectasis. Although in both these cases the Wassermann reaction was negative at the onset of the thrombosis, the author thinks it is still quite possible that there is a relation between the syphilitic infection and the central vein thrombosis.

AM. J. SYPH., GONOR. & VEN. DIS., ST. LOUIS

Hyaluronidase and experimental syphilis. III. Metachromasia in syphilitic orchitis and its relationship to hyaluronic acid. Virgil Scott and Gustave J. Dammin. Am. J. Syph., Gonor., & Ven. Dis., 34 : 501–514, Nov. 1950.

The authors, working at Washington University, studied the histopathology of syphilitic orchitis to determine the responsible factors. Earliest microscopic change during the first 40 days, following inoculation with 0.5 cc. of a saline emulsion of minced testicular syphilomas, was an alteration of the connective tissue toward that of the embryonal type appearing first in the tunics. In tissue stained with toluidine blue or with thionin, connective tissue of the embryonal type stained metachromatically. The phenomenon of metachromasia was either prevented or diminished by exposure of tissue sections to testicular hyaluronidase prior to staining with dyes.

Studies on the life cycles of spirochetes. II. The development of a new stain. Edward D. DeLamater, Merle Haanes, and Richter H. Wiggall. Am. J. Syph., Gonor. & Ven. Dis., 34: 515–518, Nov. 1950.

A modification of the Fontana stain technic is presented in which the preparation is treated by means of tannic acid and then exposed to a solution of carbolmethyl violet. By this technic, the spirochetes in impression smears stain a deep violet purple and are easily visualized by means of good optics.

Investigations of psychological processes in patients with neurosyphilis. Thomas H. Sternberg and Murray C. Zimmerman. Am. J. Syph., Gonor. & Ven. Dis., 34: 519–533, Nov. 1950.

Purpose of the study at Wadsworth Veterans' Hospital was to evaluate the use of psychologic tests in active neurosyphilis. The 66 patients, ranging in age from 16 to 68 years, were given a battery of tests. Results from the Wechsler-Bellevue Adult Scale of Intelligence are given. Those in the active symptomatic neurosyphilitic group showed mental deterioration attributable to the disease process.

A clinical psychometric procedure in the recognition of early dementing paresis. Bernard I. Lewis. Am. J. Syph., Gonor. & Ven. Dis., 34: 534–553, Nov. 1950.

An evaluation test was carried out on a group of 72 syphilitic patients from the Johns Hopkins Hospital. The Stanford-Binet Scale (vocabulary test) and the Kohs Block Test were used for determining mental age. Results suggested that when the vocabulary mental age exceeded by 3 years or more the Kohs mental age, intellectual impairment was to be suspected. Evidence suggests that this procedure objectively indicates the presence and the degree of deteriorative change.

Neurosyphilis. IV. Posttreatment evaluation four to five years following penicillin and penicillin plus malaria. Arthur C. Curtis, William T. Kruse, and Dorothy H. Norton. Am. J. Syph., Gonor. & Ven. Dis., 34: 554–564. Nov. 1950.

Of a total of 639 patients treated at the University Hospital in Ann Arbor, 430 have been adequately observed from 1 to 5 years following a single course of penicillin. Of the 430, 51 percent received penicillin alone, while 49 percent received penicillin plus malaria fever therapy. Results were the same with either type of therapy as regards clinical evaluation and ability of the patient to work. Spinal fluid results were the same except for superiority of penicillin plus malaria in the patients with paresis.

Penicillin alone in neurosyphilis: Spinal fluid response including a comparison with prepenicillin therapy. Norman R. Ingraham, John H. Stokes, and George D. Gammon. Am. J. Syph., Gonor. & Ven. Dis., 34: 566–580, Nov. 1950.

Data are presented from the University of Pennsylvania on spinal fluid response following penicillin therapy in 603 patients with neurosyphilis, some being followed into the seventh year. The spinal fluid response was most rapid in the first year following therapy and slowest and least satisfactory in paresis and taboparesis. By the fifth year 55 percent of paresis and taboparesis and 60 to 70 percent of tabes dorsalis patients presented normal or near-normal spinal fluids. Various forms of fever and chemotherapy employed in the prepenicillin era gave a similar, though slower, type of response to that observed from penicillin.

The effect of previous antisyphilitic treatment on present treatment, as indicated by the records from the Nation-wide study of penicillin in syphilis. Rowland V. Rider. Am. J. Syph., Gonor. & Ven. Dis., 34: 581–586, Nov. 1950.

An examination of the cases in the files of the Central Statistical Unit failed to reveal among patients treated with crystalline penicillin G any difference in failure rate between patients reporting a previous treatment and others. Among patients treated with amorphous penicillin a small difference did exist between

AM. J. SYPH., GONOR. & VEN. DIS., ST. LOUIS—Continued

the failure rates of patients previously treated and those without such treatment.

Oral terramycin in the treatment of gonorrhea in the male. Raymond C. V. Robinson. Am. J. Syph., Gonor. & Ven. Dis., 34: 587–589, Nov. 1950.

Report deals with results of treatment of gonorrheal urethritis at the Johns Hopkins Hospital. Since 3 of 6 patients failed to be cured with a dosage of 1 gm., the next 23 were given 2 gm. Of this group 14 of 18 who were followed from 8 to 90 days were cured. The high incidence of vomiting (3 of 18 patients) is a draw-back to this dosage of terramycin.

ANN. NEW YORK ACAD. SC., NEW YORK

Introduction. Chester S. Keefer. Ann. New York Acad. Sc., 53: 223–225, Sept. 15, 1950.

The author briefly sums up the role of terramycin as a chemotherapeutic agent in man, including its effect in venereal diseases. Large doses of the drug produce prompt and positive effects in such diseases as gonorrhea, lymphogranuloma venereum, and granuloma inguinale. Yaws also responds to the drug. When used in syphilis, terramycin causes spirochetes to disappear from lesions within 24 to 48 hours, but too little time has elapsed to allow any assessment of final results.

In vitro studies on terramycin. Thomas M. Gocke, George Gee Jackson, Clare Wilcox, and Maxwell Finland. Ann. New York Acad. Sc., 53: 297–302, Sept. 15, 1950.

Studies are reported concerning various aspects of the tests of sensitivity of bacteria to terramycin, the results of such tests carried out with recently isolated pathogenic strains (including *Neisseria gonorrhoeae*), and attempts to produce strains that are resistant to terramycin in vitro.

Terramycin in the control of venereal diseases. Arthur G. Schoch and Lee J. Alexander. Ann. New York Acad. Sc., 53: 459–460, Sept. 15, 1950.

A report is given on a small pilot series consisting of 26 cases of gonorrhea, 2 cases of primary syphilis (1 seronegative and 1 seropositive), and 1 case of granuloma inguinale treated with a low-dosage schedule of terramycin hydrochloride administered orally. The treatment appeared to be satisfactory for gonorrhea and only partially effective for granuloma inguinale. Apparently, the drug is definitely effective in the treatment of primary syphilis, but to what extent must be answered by a large-scale investigation.

ARCH. DIS. CHILDHOOD, LONDON

Gonococcal vulvovaginitis in infants and children: a study of 240 cases. Chunilal Mukherjee. Arch. Dis. Childhood, 25: 262–272, Sept. 1950.

In this series of 240 infants and children with gonococcic vulvovaginitis, 20 received orthodox local treatment, 102 received estrogen therapy, 83 received sulfonamides, and 35 received penicillin therapy. Results of local therapy were considered unsatisfactory. With estrogen, a 72- to 75-percent cure is about the average which can be expected. With penicillin and sulfonamides, a 90-percent recovery rate can be expected.

BRIT. J. VEN. DIS., LONDON

Cardiovascular syphilis. C. S. Nicol. Brit. J. Ven. Dis., 26: 109–125, Sept. 1950.

A review of the present status of cardiovascular syphilis is presented, and reference is made to most of the important work published in the last 15 years. The subject is discussed as to etiology and pathogenesis, prognosis, and treatment.

Anti-chancroidal drugs tested by the hetero-inoculation of bubo fluid from the treated donor. R. R. Willcox. Brit. J. Ven. Dis., 26: 131–135, Sept. 1950.

A method is described for testing drugs by first treating the person with the bubo with the drugs to be tested, then, after treatment has been given, injecting the bubo fluid into others to ascertain whether or not it has lost its virulence. Twelve experiments, performed on 75 recipients, involving the injection of material from 11 treated donors, showed that sulfathiazole and streptomycin were effective in preventing the experimental infection. Aureomycin and chloramphenicol were less effective but capable of aborting infection.

The cardiolipin-lecithin test for syphilis. R. P. Jayewardene and T. Velaudapillai. Brit. J. Ven. Dis., 26 : 136–138, Sept. 1950.

The cardiolipin slide test was done on 2,776 serums simultaneously with the Wassermann and Kahn tests. All samples were obtained from the Venereal Disease Clinic, General Hospital, Colombo, Ceylon. Results showed that the cardiolipin antigen was very sensitive, but false-positive results were obtained as with other lipidal antigens.

Dual testing for the serodiagnosis of syphilis. An abbreviated complement-fixation method. D. B. Colquhoun. Brit. J. Ven. Dis., 26 : 139–142, Sept. 1950.

Following the standard flocculation test, serums are tested by an abbreviated complement-fixation test. Positive and doubtful serums are submitted to the full Wassermann test; all other serums are submitted to the abbreviated test. The abbreviated test effects a saving in time and materials, since about 80 percent of all serums submitted for routine examination are flocculation-test-negative.

Late congenital syphilis. An analysis of 115 cases. Sydney M. Laird. Brit. J. Ven. Dis., 26 : 143–145, Sept. 1950.

An analysis of the findings in 115 cases discovered over a 4-year period is given. The group comprised 38 males and 77 females with ages ranging from 3 to 75 years. Interstitial keratitis was present in 45 of the group. Other findings were in form of facial appearance, dental stigmata, bones and joints, and tertiary lesions.

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## BULL. DEPT. OF HEALTH, KENTUCKY, LOUISVILLE

Venereal disease control. Public Health in Kentucky, 1949–50. Bull. Dept. of Health, Kentucky, 23 : 19–21, Dec. 1950.

Case finding, education program, mass blood testing, and the Kentucky Treatment Center are discussed in the annual report on the activities of the Division of Venereal Disease Control.

## CALIFORNIA'S HEALTH, SAN FRANCISCO

Recent developments in multiphasic screening. Lester Breslow. California's Health, 8 : 89–90, Dec. 31, 1950.

The value of combining several available tests into a multiple-screening procedure has been demonstrated in recent programs. The scope of these procedures is shown in table form. Programs conducted in California are discussed.

Health education aspects of a multiphasic screening program. Janet Anderson. California's Health, 8 : 91–92, Dec. 31, 1950.

Some of the goals of a multiphasic survey to which health education methods can be profitably applied are listed and discussed. These goals include active support and participation of community agencies and of the population to be reached by the survey, volunteers to assist in carrying out the program, community appreciation of the purpose and value of the survey, people motivated to carry out preventive measures, and patients discovered by the survey motivated to carry out the regime advised by their physicians.

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## CANAD. J. PUB. HEALTH, TORONTO

The role of epidemiology in venereal disease control. C. L. Hunt. Canad. J. Pub. Health, 41 : 485–489, Dec. 1950.

In this general report on the work of the Division of Venereal Disease Control, British Columbia Department of Health, studies to determine the type of individual who acquires venereal disease and daily examination by a public health nurse of all inmates at the Vancouver City prison, who were arrested the previous day and night, are discussed.

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## CANAD. M. A. J., MONTREAL

Immobilization of *Treponema pallidum* in vitro by a specific antibody produced in syphilis and complement. Jules Archambault. Canad. M. A. J., 63 : 483–485, Nov. 1950.

Author describes technics which make it possible to demonstrate the presence of a true syphilitic antibody in the serum of human beings and animals infected with *Treponema pallidum*. As a result of a personal visit to Dr. Turner's laboratory at Johns Hopkins University, where the author saw the test being performed and read its results, he is convinced that the immobilization test deserves to be well known by syphilologists and practiced in research laboratories.

Interstitial keratitis treated with cortisone. A. K. Geddes and M. Frances McCall. Canad. M. A. J., 63: 601, Dec. 1950.

A case report is presented of a 10-year-old white girl who, upon admission to the hospital, showed in addition to other classical signs of congenital syphilis, severe bilateral interstitial keratitis. She was given penicillin and cortisone treatment, which resulted in more rapid improvement than would have been expected with penicillin alone.

## CIRCULATION, BALTIMORE

Aortic length: angiocardiographic measurements. Charles T. Dotter, Douglas J. Roberts, and Israel Steinberg. Circulation, 2: 915–920, Dec. 1950.

An angiocardiographic study of the length of the thoracic aorta was made, and results are presented in 84 cases without aortic disease other than arteriosclerosis, 51 cases of syphilitic aortitis, and 26 cases of hypertension. It was found that all these conditions produce elongation of the aorta, and syphilitic aortitis produces disproportionate elongation of the ascending portion of the aorta as compared to arteriosclerosis or hypertension—a significant fact in angiocardiographic diagnosis of syphilitic aortitis.

## CLIN. J., LONDON

The causes of hemiplegia. John S. Parkinson. Clin. J., 79: 294–300, Nov. 1950.

The author defines hemiplegia and discusses the more important causes as they arise in the various age groups. Syphilis is one of the causes considered.

## DELAWARE STATE M. J., FARNHURST

Is congenital syphilis a problem in Delaware? Winder L. Porter. Delaware State M. J., 22: 244–245, Sept. 1950.

Information is presented which indicates that congenital syphilis is still a problem in Delaware, and recommendations are made of procedures to be followed in the attack against this disease.

## ILLINOIS HEALTH MESSENGER, SPRINGFIELD

Congenital syphilis. Illinois Health Messenger, 22: 4, Dec. 15, 1950.

The problem of congenital syphilis in Illinois is discussed. Since the State's prenatal law was passed in 1939, about 3,000 cases have been reported exclusive of Chicago. Prevalence has tended downward, reaching a low of 199 cases in 1949.

## J. M. A. ALABAMA, MONTGOMERY

Clinical symposium on present day use of antibacterial and chemotherapeutic agents. Part I—General information. Allen E. Hussar and Howard L. Holley. J. M. A. Alabama, 20: 193–203, Dec. 1950.

The purpose of this review of the literature is to correlate available material on chemotherapeutic agents and make it applicable for use by everyday clinicians. Dosage schedules and toxicity of various agents used in treatment of infections, including gonorrhea and syphilis, are considered.

## J. PHILIPPINE M. A., MANILA

A report of the national blood program. Romeo Y. Atienza and Onofre Buensuceso. J. Philippine M. A., 26: 349–353, Aug. 1950.

In 1949 the Philippine National Red Cross collected and processed 972,075 cc. of blood. Of 4,234 donors registered and examined following careful preliminary screening, only 3,345 (79.1 percent) were deemed qualified. In spite of the care in screening donors during the predonation registration, and outright rejection of those who gave a history of venereal disease infection, serologic examination of the procured blood showed that 5.82 percent were from one plus to four plus positive for Kahn.

## J. ROY. ARMY M. CORPS, LONDON

The health of the Guards Brigade in Malaya. R. W. Scott and R. B. Stalbow. J. Roy. Army M. Corps, 95: 196–199, Oct. 1950.

In this survey one group of three battalions of the British Guards Brigade and

J. ROY. ARMY M. CORPS, LONDON—Con.

one control group of three battalions were studied in the period from November 1948 to October 1949. Taking the Guards as a whole, the combined admission rate for five preventable diseases was exactly one-half of the corresponding figures for the control group. In the case of venereal diseases the rate for the Guards was one-third of the rate for the combined control group. Reasons for the variations are discussed.

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J. ROY. EGYPTIAN M. A., CAIRO

International serodiagnostic conference (syphilis) to be organized by the World Health Organization. News Page. J. Roy. Egyptian M. A., 33 : 662–664, No. 6, 1950.

History of international serodiagnostic conferences held by the League of Nations, United States Public Health Service, and World Health Organization from 1923 to 1949 is reviewed. Serodiagnostic Laboratory Conference to be held after October 1951 is discussed.

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J. SOCIAL HYG., NEW YORK

Partners. How social hygiene works with you in your community to build healthy personal and family life. J. Social Hyg., 36 : 340–342, Nov. 1950.

Role played by the American Social Hygiene Association in the control of venereal diseases through educational campaigns and suppression of prostitution is described.

Who knows what about VD? Results of an exploratory study. John A. Morsell and Rose K. Goldsen. J. Social Hyg., 36 : 345–363, Nov. 1950.

This paper presents and examines data concerning knowledge and popular opinion about venereal diseases, as obtained in 254 interviews in Manhattan during the spring of 1948.

William Freeman Snow, M. D. A commemoration of his life and work. J. Social Hyg., 36 : 387–416, Dec. 1950.

The life and work of the former President of the American Social Hygiene Association is reviewed in this commemorative issue of his death on October 26, 1950.

J. SOUTH CAROLINA M. A., FLORENCE

Prenatal blood tests. J. South Carolina M. A., 46 : 318, Oct. 1950.

Attention is directed to the fact that some physicians are failing to have serologic tests for syphilis performed upon all pregnant women who come under their care. A reminder is given to these doctors of certain sections of the law of South Carolina upon this subject.

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J. TENNESSEE M. A., NASHVILLE

"Biologic false" positive serologic test for syphilis. Editorial. J. Tennessee M. A., 43 : 423–425, Nov. 1950.

In the absence of clinical evidence a positive blood test for syphilis is a difficult problem facing any physician. Causes of such reactions are discussed. It is suggested that treatment be withheld until a positive diagnosis is made.

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M. ANN. DISTRICT OF COLUMBIA, WASHINGTON

Penicillin prophylaxis of postoperative bacteremia and bacterial endocarditis. Paul A. Lichtman and Arthur M. Master. M. Ann. District of Columbia, 19 : 663–672, 724, Dec. 1950.

In 406 consecutive autopsies on patients 50 years old or more at the Mount Sinai Hospital, 342 (84.2 percent) disclosed evidence of heart disease, of which 3 (0.9 percent) had syphilitic aortic valve involvement.

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M. CLIN. NORTH AMERICA, PHILADELPHIA

The role of the bacteriologist in the diagnosis and control of acute infectious diseases. Earle H. Spaulding. Symposium on the Infectious Diseases. M. Clin. North America, 34 : 1589–1603, Nov. 1950.

The development in rapid succession of new antibiotics with overlapping spectra of activity has increased the importance of the role of the bacteriology laboratory in the diagnosis and control of acute bacterial infections. Technical developments, which have kept pace with the clinical use of antibiotics, are reviewed. The methods by which the practitioner can most effectively receive help from the bacteriologist are described.

M. CLIN. NORTH AMERICA, PHILADELPHIA—Continued

The role of the virologist in the diagnosis of acute infectious diseases. M. Michael Sigel. Symposium on the Infectious Diseases. M. Clin. North America, 34 : 1605–1620, Nov. 1950.

The methods of diagnosing viral and rickettsial diseases, including lymphogranuloma venereum, inclusion blennorrhea, and viral keratoconjunctivitis among others, are presented, together with a discussion of the physician's responsibilities and limitations and value of the diagnostic service.

Meningitis and encephalitis in infants and children. Waldo E. Nelson. Symposium on the Infectious Diseases. M. Clin. North America, 34 : 1679–1692, Nov. 1950.

Purulent and nonpurulent meningeal infections, including syphilitic meningitis, are discussed as to diagnosis and treatment.

M. J. AUSTRALIA, SYDNEY

Treatment of syphilis with penicillin at the Government venereal diseases clinic, Sydney : Preliminary report. J. H. Abbott. M. J. Australia, 2 : 618–622, Oct. 21, 1950.

Schedules for procaine penicillin therapy and methods of control and follow-up investigation, adopted at the New South Wales State Government venereal diseases clinic, are discussed. Of 75 patients who have been under observation for periods of from 1 to 11 months, 3 have relapsed, while the remainder appear to be progressing satisfactorily. Of 182 patients who received the treatment, 7 (3.8 percent) had allergic reactions.

M. PRESS, LONDON

The diagnosis and treatment of gonorrhea. Robert Lees. M. Press. No. 5813 : 321–323, Oct. 4, 1950.

Diagnosis in male and female, interpretation of laboratory reports, specific and local treatment, proof of cure, and fear of venereal disease as a cause of psychologic illness, are discussed.

Early radiological diagnosis of disease of bone. Frank Ingraham. M. Press, No. 5813 : 323–327, Oct. 4, 1950.

In this discussion of conditions which affect the bone structure, congenital syphilis during infancy and childhood, and syphilis in early to middle adult life are considered.

Some recent advances in the treatment of venereal disease. Sydney M. Laird. M. Press, No. 5817 : 429–431, Nov. 1, 1950.

The author reviews the diagnosis and treatment of syphilis and gonorrhea and mentions briefly treatment of other venereal diseases. Follow-up and the determination of cure are considered.

M. TIMES, EAST STROUDSBURG

Gonorrhea. Special Article. M. Times, 78 : 453–460, Oct. 1950.

A summarization of essential therapeutic information on the subject is presented as a time-saving refresher for the busy practitioner. Symptoms and diagnosis in the male and female, laboratory procedures used in diagnosis, complications in the male and female, therapy, determination of cure, and prophylaxis are considered.

M. WOMAN'S J., CINCINNATI

Medical aspects of marriage counselling. Anna Kleegman Daniels. M. Woman's J., 57 : 19–26, Nov. 1950.

In this general article on marriage, diagnosis and treatment of *Trichomonas vaginalis* vaginitis are briefly discussed.

MED. ILLUSTRATED, LONDON

The conquest of venereal diseases with antibiotics. R. R. Willcox. Med. Illustrated, 4 : 496–501, Oct. 1950.

A review of the literature is presented. Treatment and prophylaxis of syphilis, gonorrhea, chancroid, lymphogranuloma venereum, granuloma inguinale, and nonspecific urethritis are discussed.

MICHIGAN PUB. HEALTH, LANSING

Venereal disease facts on the midway. Michigan Pub. Health, 38 : 130–131, Nov. 1950.

The venereal disease educational program at the State and county fairs in Michigan is described. "Since Adam and Eve," a walk-through-type exhibit, attracted 155,000 fair patrons.

Michigan's health at the half-century. Venereal disease control. Michigan Pub. Health, 38 : 153, Dec. 1950.

Michigan Department of Health annual report shows that the 1950 reported incidence of syphilis was expected to be about 8,825 cases as compared with 8,740 cases in 1949; infectious syphilis with 609 cases and congenital syphilis with 289 cases were both at an all-time low for the State.

NEBRASKA M. J., NORFOLK

Federal evaluation of State Health Department laboratories in serology of syphilis. L. O. Vose. Nebraska M. J., 35 : 366, Nov. 1950.

A statement is presented of the standing of the Nebraska State Health Department's laboratory at Lincoln in the 1950 evaluation conducted by the United States Public Health Service. Included also is a condensed summary of the evaluation results of all test performances from 48 State laboratories and control laboratories, accompanied by a brief discussion.

NEW ENGLAND J. MED., BOSTON

Serologic tests in the diagnosis of infectious diseases. John C. Ayres and Roy F. Feemster. New England J. Med., 243 : 996–1002, Dec. 21, 1950; 1034–1043, Dec. 28, 1950.

An extensive review of the literature is presented. Serologic tests used in diagnosis of various diseases including syphilis and lymphogranuloma venereum are considered.

NEW YORK STATE J. MED., NEW YORK

Recent advances in dermatologic therapy. Frank C. Combes and Maurice J. Costello. New York State J. Med., 50 : 2678–2682, Nov. 15, 1950.

For treatment of condylomata acuminata, 20- to 25-percent solutions of podophyllin in 95-percent alcohol or in compound tincture of benzoin are recommended.

Fifty years' progress in the treatment of syphilis. Isadore Rosen and Nathan Sobel. New York State J. Med., 50 : 2694–2696, Nov. 15, 1950.

Changes in types of syphilis seen formerly and those encountered today, methods of treatment with salvarsan, neosalvarsan, and bismuth, discovery, dosage schedules, and use of penicillin in various types of syphilis are reviewed.

NORTH CAROLINA M. J., WINSTON-SALEM

The concept of multiphasic screening for chronic diseases. Cecil G. Sheps. North Carolina M. J., 11 : 626–630, Nov. 1950.

In this general discussion, in which results of the San Jose, Calif., Richmond, Va., and Harnett County, N. C., programs are given, the author expresses belief that when its purpose, limitations, and potentialities are kept in mind, multiphasic screening seems to offer real promise of being a practical measure in the control of chronic diseases.

PEDIATRICS, SPRINGFIELD

Congenital syphilis. Betty Huse, W. H. Aufranc, and Mary S. Goodwin. Pediatrics, 6 : 321–324, Aug. 1950.

Procedures are presented which should eradicate congenital syphilis, which still occurs too frequently. The program includes adequate case finding and treatment of pregnant women. Detection and treatment at the youngest age possible for those children with congenital syphilis are recommended.

POST-GRAD. M. J., LONDON

Sigmoidoscopy. T. C. Morton. Post-Grad. M. J., 26 : 577–584, Nov. 1950.

The method of sigmoidoscope examination is considered and sigmoidoscopic appearance in various diseases, including lymphogranuloma venereum and syphilis of the rectum, is described.

POSTGRAD. MED., MINNEAPOLIS

An improved vaginal cream in the practice of gynecology. Hubert A. Hensel. Postgrad. Med., 8 : 293–296, Oct. 1950.

An improved vaginal cream containing 2 percent allantoin, 15 percent sulfanilamide, and 0.2 percent 9-aminoacridine, in a water-miscible base buffered to an acid reaction, was used to treat 143 patients from private practice, of whom 39 had *Trichomonas vaginalis* vaginitis. Symptomatic and bacteriologic cures were obtained in all 39 patients with *Tricho-*

*monas vaginalis* infections, 3 of whom required a second course of treatment to obtain the desired clinical result.

Intravenous procaine; an evaluation of some of its uses. Robert M. Kerr and William F. Brehm. Postgrad. Med., 8: 444–453, Dec. 1950.

At the Guthrie Clinic and the Robert Packer Hospital procaine was given intravenously for 18 months (1947 to 1949). Of 6 patients who received the drug for various conditions, 4 had tabes dorsalis. Poor results were obtained with the use of the drug in tabes dorsalis with lightning pains.

## Proc. Soc. Exper. Biol. & Med., Utica

Antigenic similarity of five human strains of pleuropneumonia-like organisms. M. C. Norman, S. Saslaw, and L. R. Kuhn. Proc. Soc. Exper. Biol. & Med., 75: 718–720, Dec. 1950.

Suspensions of pleuropneumonia-like organisms (PPLO) suitable for rabbit immunization and for use in agglutination tests were produced from cystine trypticase broth. Five human strains of PPLO were closely related antigenically. These strains failed to agglutinate in the presence of normal rabbit and human serums. Serums from 18 cases of nongonococcic urethritis failed to agglutinate suspensions of 5 human strains of PPLO.

## Pub. Health Nursing, New York

A new simple blood test for syphilis: procedure for collecting specimens. Hazel Shortal and Rosalie Giacomo. Pub. Health Nursing, 42: 544–546, Oct. 1950.

The filter paper microscopic test (FPM) is described as a suitable technic for nurses. Advantages are its ease, simplicity, and assurance of obtaining a specimen, and relative safety of the method in contrast to the dangers inherent in obtaining specimens from infants' jugular veins. Chart is given which shows method of obtaining specimens.

## Pub. Health Rep., Washington

Multiple screening. Chronic disease. Pub. Health Rep., 65: 1658–1661, Dec. 15, 1950.

Discussions of the concept of multiple screening and the Alabama, Indianapolis, New Orleans, Richmond, and Atlanta projects are included in this report on the scientific highlights of the 78th Annual Meeting of the American Public Health Association, St. Louis, October 30 to November 3, 1950.

False positive high in Central America. Syphilis Serology. Pub. Health Rep., 65: 1687, Dec. 15, 1950.

Highlights of the 78th Annual Meeting of the American Public Health Association, St. Louis, October 30 to November 3, 1950, include report that certain serology test methods for syphilis that have proved reliable in the United States are giving a high percentage of false-positive reactions in Guatemala and Panama.

## Rocky Mountain M. J., Denver

Experiences with penicillin in syphilotherapy. Edgar B. Johnwick. Rocky Mountain, M. J., 47: 931–936, Dec. 1950.

Treatment of syphilis is discussed by considering general therapeutic principles and reviewing some of the questions most frequently telephoned or written to the United States Public Health Service Medical Center in Hot Springs by general practitioners.

## Sc. News Lett., Washington

PPLO may be cause of many mystery illnesses. Sc. News Lett., 58: 296, Nov. 4, 1950.

Brief news item refers to studies of pleuropneumonia-like organisms reported by Harry E. Morton, Paul R. Leberman, and Paul Francis Smith to a meeting of the Society of American Bacteriologists. These germs are reported to be found in saliva, throat cultures, and stools of human patients rather than confined to the genito-urinary tract as previously reported.

## South Dakota J. Med. & Pharm., Sioux Falls

Current trends in antibiotic therapy. Edwin J. Pulaski. South Dakota J. Med. & Pharm., 3: 299–304, 320, Oct. 1950.

The author reviews information available at present concerning the use of an-

SOUTH DAKOTA J. Med. & PHARM., SIOUX FALLS—Continued

tibiotics against common infections. Among the subjects considered are criteria of selection, pharmacology, routes of administration, dosages, toxic reactions, drug resistance, current indications for antimicrobial therapy, the selection of antibiotics in special diseases, and therapeutic failure.

SOUTH. M. J., BIRMINGHAM

Pharmacologic reactions of normal and psychotic blood sera. David I. Macht. South. M. J., 43:1049–1057, Dec. 1950.

A study of the blood serums of 1,200 patients with all types of psychoses, including paresis, at four Maryland institutions in the past 10 years is presented. From the results, which reveal that all true psychoses produce a phytotoxic influence on the root growth of *Lupinus* seedlings, the author concludes that the phytopharmacologic approach can no longer be regarded as of a preliminary and heuristic nature but promises to become a useful objective scientific approach to further studies of mental diseases.

SOUTH. SURGEON, ATLANTA

Uterine bleeding: the gynecologist's bete noire. Gilbert F. Douglas. South. Surgeon, 16: 1072–1080, Nov. 1950.

A summary of 107 cases studied with endometrial biopsies is presented. Syphilis, trichomonas vaginitis, and chancre of the labia minora are listed among the causes of uterine bleeding.

STAT. NAVY MED., WASHINGTON

Sick days—1949. Stat. Navy Med., 6: 7–8, Sept. 1950.

Of 3,637,361 sick days accumulated during 1949 by Navy and Marine Corps personnel, 122,153 (3.4 percent) were attributable to venereal diseases.

Venereal disease. Current Morbidity. Stat. Navy Med., 6: 21, Sept. 1950.

Following World War II the incidence rate for venereal diseases among Navy and Marine Corps personnel reached a high of 110 per 1,000 in October 1946. Since then the rates have decreased sharply, reaching a postwar low of 32 in December 1949. Annual rates for 1947, 1948, and 1949 are given.

Postwar trends in venereal disease. Stat. Navy Med., 6: 4, Oct. 1950.

Incidence rates for venereal disease among Navy and Marine Corps personnel during and after World Wars I and II are compared. Significantly, the rates decreased markedly during both wars. However, after World War I, the rates increased and in the period between 1919 and 1933 hovered between 120 and 130 per 1,000. After World War II the rates increased for only 2 years and then declined rapidly to a low of 42 per 1,000 in 1949.

Venereal disease aboard ships. Current Morbidity. Stat. Navy Med., 6: 17, Nov. 1950.

Incidence rates for venereal disease among Navy and Marine Corps personnel aboard ships of the Pacific and Atlantic fleets are compared. Ships as a whole maintained fairly level rates during the first 7 months of 1950, with a sharp rise to above 100 per 1,000 in August.

TEXAS STATE J. MED., FORT WORTH

Generalized late cutaneous syphilids. Report of a case. John H. Harris and Leonard Meltzer. Texas State J. Med., 46: 845–847, Nov. 1950.

The patient was a 63-year-old white man who was free of any evidence of cutaneous syphilis for 28 years after the initial infection in spite of not having had treatment. The outstanding point of interest in this case was that it demonstrated an unusual generalization of a late cutaneous syphilid.

UROL. & CUTAN. REV., WEST PALM BEACH

Recent improvements of the Hecht complement fixation test for syphilis using active sera. Hugo Hecht. Urol. & Cutan. Rev., 54: 616–620, Oct. 1950.

The author discusses preparation of the antigen, evaluation of the hemolytic power of the serums, test with spinal fluid, and routine for 50 serums.

# STATISTICS

## Cases of Venereal Disease Reported to the Public Health Service by State and Territorial Health Departments, Fiscal Year 1950 (by Disease, Stage, and Reporting Source)

[Known military cases excluded]

| Federal Security Agency regions | Syphilis | | | | | | | | | | | | Gonorrhea | | Chancroid | | Granuloma inguinale | | Lymphogranuloma venereum | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Total | | Primary and secondary | | Early latent | | Late and late latent | | Congenital | | Stage not stated | | | | | | | | | |
| | Private physician | Other[1] | Private physician | Other[1] | Private physician | Other[1] | Private physician | Other[1] | Private physician | Other[1] | Private physician | Other[1] | Private physician | Other[1] | Private physician | Other[1] | Private physician | Other[1] | Private physician | Other[1] |
| Region 1—Total | 2,169 | 1,740 | 387 | 220 | 370 | 334 | 1,080 | 985 | 114 | 106 | 218 | 95 | 1,382 | 2,334 | 5 | 20 | 0 | 2 | 5 | 2 |
| Connecticut | 464 | 399 | 53 | 50 | 137 | 122 | 187 | 165 | 28 | 17 | 59 | 45 | 373 | 495 | 2 | 6 | 0 | 0 | 3 | 1 |
| Maine | 318 | 145 | 137 | 39 | 53 | 30 | 117 | 69 | 10 | 7 | 1 | 0 | 144 | 153 | 2 | 2 | 0 | 0 | 0 | 0 |
| Massachusetts | 545 | 932 | 95 | 121 | 96 | 159 | 322 | 583 | 32 | 69 | 0 | 0 | 497 | 1,550 | 1 | 12 | 0 | 2 | 1 | 1 |
| New Hampshire | 146 | 6 | 22 | 0 | 15 | 0 | 89 | 5 | 17 | 1 | 3 | 0 | 75 | 1 | 0 | 0 | 0 | 0 | 1 | 0 |
| Rhode Island | 423 | 258 | 14 | 10 | 57 | 23 | 259 | 163 | 19 | 12 | 74 | 50 | 140 | 135 | 0 | 0 | 0 | 0 | 0 | 0 |
| Vermont | 273 | 0 | 66 | 0 | 12 | 0 | 106 | 0 | 8 | 0 | 81 | 0 | 153 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Region 2—Total | 15,376 | 25,480 | 1,275 | 2,533 | 3,231 | 6,739 | 10,298 | 14,711 | 421 | 837 | 151 | 660 | 5,703 | 31,436 | 17 | 371 | 8 | 169 | 10 | 238 |
| Delaware | 341 | 335 | 79 | 58 | 113 | 107 | 62 | 99 | 6 | 9 | 81 | 62 | 62 | 180 | 0 | 1 | 0 | 0 | 0 | 3 |
| New Jersey | 3,218 | 3,146 | 272 | 257 | 916 | 1,093 | 1,934 | 1,631 | 82 | 130 | 14 | 35 | 1,038 | 2,954 | 6 | 16 | 2 | 9 | 4 | 14 |
| New York | 9,997 | 14,497 | 801 | 1,204 | 1,612 | 2,740 | 7,245 | 9,960 | 283 | 381 | 56 | 212 | 3,770 | 17,159 | 10 | 266 | 6 | 89 | 6 | 166 |
| New York City | 7,246 | 13,184 | 570 | 1,096 | 1,458 | 2,646 | 5,052 | 8,895 | 141 | 344 | 25 | 203 | 2,173 | 15,688 | 10 | 257 | 6 | 87 | 6 | 162 |
| Pennsylvania | [2]1,820 | [2]7,502 | [2]123 | 1,014 | [2]590 | 2,799 | [2]1,057 | [2]3,021 | [2]50 | 317 | 0 | [2]351 | [2]833 | [2]11,143 | [2]1 | [2]88 | 0 | [2]71 | 0 | 55 |
| Philadelphia | 1,091 | 4,606 | 23 | 586 | 439 | 1,884 | 612 | 2,010 | 17 | 126 | 0 | 0 | 679 | 7,942 | 0 | 49 | 0 | 48 | 0 | 27 |
| Region 3—Total | 4,248 | 17,774 | 853 | 3,568 | 1,362 | 6,152 | 1,788 | 6,879 | 137 | 914 | 108 | 261 | 3,195 | 50,246 | 15 | 1,496 | 2 | 248 | 3 | 276 |
| District of Columbia | 164 | 2,872 | 18 | 316 | 60 | 890 | 85 | 1,574 | 0 | 69 | 1 | 23 | 339 | 14,892 | 2 | 939 | 0 | 54 | 0 | 33 |
| Maryland | 581 | 4,405 | 136 | 750 | 139 | 1,052 | 221 | 2,240 | 13 | 208 | 72 | 155 | 599 | 7,730 | 4 | 119 | 0 | 47 | 0 | 49 |
| Baltimore | 336 | 3,142 | 67 | 459 | 85 | 695 | 114 | 1,728 | 12 | 112 | 68 | 148 | 363 | 6,709 | 2 | 111 | 0 | 40 | 0 | 38 |
| North Carolina | 384 | 5,357 | 111 | 1,426 | 170 | 2,474 | 98 | 1,090 | 5 | 367 | 0 | 0 | 382 | 15,182 | 3 | 275 | 1 | 69 | 3 | 118 |
| Virginia | 1,201 | 3,524 | 287 | 700 | 464 | 1,297 | 395 | 1,273 | 20 | 171 | 35 | 83 | 1,210 | 9,094 | 3 | 113 | 0 | 73 | 0 | 74 |
| West Virginia | 1,918 | 1,616 | 301 | 376 | 529 | 439 | 989 | 702 | 99 | 99 | 0 | 0 | 665 | 3,348 | 3 | 50 | 1 | 5 | 0 | 2 |
| Region 4—Total | 13,989 | 12,506 | 1,036 | 1,493 | 3,803 | 3,461 | 7,982 | 6,717 | 522 | 675 | 646 | 160 | 4,153 | 20,031 | 28 | 337 | 3 | 37 | 4 | 65 |
| Kentucky | 1,499 | 1,919 | 171 | 384 | 390 | 527 | 856 | 864 | 48 | 127 | 34 | 17 | 430 | 4,740 | 1 | 18 | 1 | 3 | 0 | 7 |
| Michigan | 4,213 | 4,150 | 386 | 422 | 841 | 1,055 | 2,238 | 2,331 | 136 | 199 | 612 | 143 | 2,192 | 7,021 | 19 | 231 | 0 | 19 | 2 | 29 |
| Ohio | 8,277 | 6,437 | 479 | 687 | 2,572 | 1,879 | 4,888 | 3,522 | 338 | 349 | 0 | 0 | 1,531 | 8,270 | 8 | 88 | 2 | 15 | 2 | 29 |
| Region 5—Total | 10,408 | 9,119 | 1,324 | 1,564 | 2,368 | 2,663 | 6,167 | 4,517 | 424 | 364 | 125 | 11 | 4,826 | 22,155 | 18 | 274 | 3 | 45 | 5 | 103 |
| Illinois | 6,011 | 6,385 | 834 | 1,170 | 1,478 | 2,041 | 3,517 | 2,940 | 182 | 234 | 0 | 0 | 3,698 | 18,687 | 9 | 251 | 2 | 35 | 3 | 100 |
| Chicago | 2,680 | 4,722 | 329 | 776 | 944 | 1,573 | 1,358 | 2,193 | 49 | 180 | 0 | 0 | 1,377 | 16,170 | 5 | 240 | 1 | 30 | 0 | 97 |
| Indiana | 2,158 | 1,838 | 259 | 326 | 576 | 511 | 1,208 | 906 | 115 | 95 | 0 | 0 | 401 | 2,582 | 4 | 22 | 1 | 9 | 2 | 3 |
| Minnesota | 398 | 665 | 28 | 25 | 54 | 51 | 291 | 553 | 17 | 25 | 8 | 11 | 486 | 471 | 1 | 0 | 0 | 0 | 0 | 0 |
| Wisconsin | 1,841 | 231 | 203 | 43 | 260 | 60 | 1,151 | 118 | 110 | 10 | 117 | 0 | 241 | 415 | 4 | 1 | 0 | 1 | 0 | 0 |

| | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Region 6—Total | 12,249 | 48,526 | 2,008 | 7,428 | 3,592 | 17,319 | 4,375 | 17,993 | 237 | 5,676 | 2,037 | 110 | 4,003 | 81,601 | 35 | 1,957 | 25 | 1,242 | 22 | 449 |
| Alabama | 3,021 | 6,578 | 279 | 1,224 | 395 | 3,057 | 516 | 1,808 | 28 | 438 | 2,003 | 51 | 985 | 4,029 | 4 | 163 | 5 | 113 | 7 | 28 |
| Florida | 5,396 | 5,782 | 1,012 | 966 | 1,946 | 2,267 | 2,343 | 2,184 | 95 | 365 | 0 | 0 | 796 | 13,472 | 6 | 253 | 9 | 589 | 1 | 50 |
| Georgia | 294 | 8,609 | 204 | 2,019 | 37 | 2,268 | 53 | 3,038 | 0 | 1,284 | 0 | 0 | 2 | 14,558 | 0 | [3]780 | 0 | [3]253 | 0 | [3]167 |
| Mississippi | 1,448 | 9,997 | 281 | 887 | 492 | 2,251 | 611 | 5,442 | 64 | 1,417 | 0 | 0 | 1,159 | 11,588 | 18 | 337 | 6 | 121 | 3 | 118 |
| South Carolina | 452 | 5,698 | 83 | 926 | 122 | 2,722 | 237 | 1,715 | 10 | 385 | 0 | 0 | 320 | 9,244 | 2 | 184 | 4 | 120 | 4 | 19 |
| Tennessee | 1,632 | 3,880 | 148 | 790 | 596 | 1,359 | 815 | 1,426 | 39 | 285 | 34 | 20 | 726 | 20,996 | 4 | 182 | 1 | 42 | 2 | 57 |
| Puerto Rico | 0 | 7,890 | 0 | 598 | 0 | 3,363 | 0 | 2,350 | 0 | 1,547 | 0 | 32 | 0 | 7,596 | 0 | 58 | 0 | 4 | 0 | 10 |
| Virgin Islands | 6 | 92 | 1 | 18 | 4 | 32 | 0 | 30 | 1 | 5 | 0 | 7 | 15 | 118 | 1 | 0 | 0 | 0 | 5 | 0 |
| Region 7—Total | 6,944 | 5,387 | 1,047 | 667 | 1,597 | 1,386 | 3,679 | 3,002 | 318 | 268 | 303 | 64 | 1,868 | 6,472 | 10 | 75 | 4 | 21 | 5 | 14 |
| Iowa | 1,563 | 532 | 225 | 66 | 268 | 129 | 932 | 299 | 98 | 28 | 40 | 10 | 431 | 323 | 2 | 1 | 0 | 0 | 0 | 0 |
| Kansas | 1,422 | 1,216 | 195 | 113 | 331 | 238 | 792 | 775 | 59 | 69 | 45 | 21 | 277 | 1,134 | 2 | 4 | 1 | 0 | 1 | 2 |
| Missouri | 2,774 | 3,122 | 468 | 400 | 753 | 823 | 1,373 | 1,722 | 101 | 153 | 79 | 24 | 682 | 4,123 | 5 | 44 | 3 | 20 | 4 | 11 |
| St. Louis | 1,315 | 1,565 | 153 | 218 | 403 | 442 | 730 | 841 | 29 | 64 | 0 | 0 | 255 | 2,392 | 2 | 31 | 1 | 9 | 0 | 9 |
| Nebraska | 777 | 302 | 69 | 26 | 142 | 101 | 410 | 169 | 38 | 5 | 118 | 1 | 192 | 706 | 1 | 24 | 0 | 1 | 0 | 1 |
| North Dakota | 248 | 0 | 58 | 0 | 61 | 0 | 102 | 0 | 9 | 0 | 18 | 0 | 164 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| South Dakota | 160 | 215 | 32 | 62 | 42 | 95 | 70 | 37 | 13 | 13 | 3 | 8 | 122 | 186 | 0 | 2 | 0 | 0 | 0 | 0 |
| Region 8—Total | 8,540 | 26,757 | 1,451 | 3,456 | 2,424 | 8,163 | 3,129 | 11,488 | 235 | 3,123 | 1,301 | 527 | 13,466 | 32,348 | 36 | 640 | 4 | 182 | 6 | 256 |
| Arkansas | 2,250 | 6,054 | 327 | 505 | 816 | 1,432 | 1,026 | 3,217 | 64 | 891 | 17 | 9 | 1,209 | 3,037 | 12 | 80 | 2 | 14 | 1 | 58 |
| Louisiana | 905 | 8,930 | 6 | 1,011 | 68 | 2,536 | 147 | 3,969 | 3 | 911 | 681 | 503 | 112 | 11,548 | 0 | 310 | 0 | 116 | 1 | 64 |
| New Mexico | 250 | 913 | 63 | 170 | 81 | 355 | 87 | 307 | 19 | 81 | 0 | 0 | 113 | 622 | 2 | 14 | 0 | 0 | 0 | 1 |
| Oklahoma | 1,624 | 1,687 | 138 | 355 | 378 | 406 | 1,009 | 824 | 55 | 87 | 44 | 15 | 792 | 4,784 | 3 | 91 | 1 | 8 | 0 | 9 |
| Texas | 3,511 | 9,173 | 917 | 1,415 | 1,081 | 3,434 | 860 | 3,171 | 94 | 1,153 | 559 | 0 | 11,240 | 12,357 | 19 | 145 | 1 | 44 | 4 | 124 |
| Region 9—Total | 1,281 | 831 | 217 | 146 | 286 | 215 | 658 | 373 | 72 | 44 | 48 | 53 | 512 | 1,696 | 4 | 20 | 0 | 1 | 1 | 2 |
| Colorado | 616 | 356 | 103 | 86 | 157 | 62 | 313 | 178 | 43 | 30 | 0 | 0 | 197 | 1,109 | 1 | 11 | 0 | 1 | 1 | 2 |
| Idaho | 124 | 184 | 7 | 15 | 20 | 36 | 75 | 124 | 4 | 2 | 18 | 7 | 89 | 318 | 2 | 9 | 0 | 0 | 0 | 0 |
| Montana | 205 | 86 | 43 | 13 | 55 | 59 | 98 | 5 | 6 | 7 | 3 | 2 | 63 | 79 | 1 | 0 | 0 | 0 | 0 | 0 |
| Utah | 197 | 127 | 30 | 23 | 16 | 38 | 119 | 44 | 14 | 2 | 18 | 20 | 106 | 143 | 0 | 0 | 0 | 0 | 0 | 0 |
| Wyoming | 139 | 78 | 34 | 9 | 38 | 20 | 53 | 22 | 5 | 3 | 9 | 24 | 57 | 47 | 0 | 0 | 0 | 0 | 0 | 0 |
| Region 10—Total | 6,053 | 10,761 | 884 | 1,346 | 1,219 | 2,417 | 3,649 | 6,415 | 248 | 522 | 53 | 61 | 5,060 | 20,533 | 35 | 500 | 4 | 22 | 5 | 182 |
| Arizona | 591 | 1,791 | 97 | 299 | 239 | 804 | 216 | 586 | 39 | 102 | 0 | 0 | 269 | 1,237 | 4 | 9 | 0 | 0 | 1 | 2 |
| California | 4,108 | 7,547 | 620 | 860 | 737 | 1,349 | 2,599 | 4,953 | 133 | 339 | 19 | 46 | 3,151 | 16,745 | 15 | 382 | 1 | 21 | 3 | 172 |
| Los Angeles | 1,301 | 2,393 | 165 | 223 | 245 | 379 | 837 | 1,701 | 50 | 75 | 4 | 15 | 515 | 6,631 | 6 | 95 | 0 | 5 | 0 | 23 |
| San Francisco | 389 | 811 | 55 | 171 | 80 | 178 | 242 | 442 | 11 | 12 | 1 | 8 | 298 | 1,989 | 2 | 136 | 1 | 5 | 1 | 102 |
| Nevada | 328 | 167 | 35 | 17 | 27 | 11 | 250 | 128 | 16 | 11 | 0 | 0 | 132 | 203 | 4 | 3 | 3 | 0 | 0 | 0 |
| Oregon | 150 | 508 | 31 | 60 | 26 | 110 | 89 | 325 | 4 | 13 | 0 | 0 | 148 | 592 | 3 | 22 | 0 | 0 | 0 | 0 |
| Washington | 467 | 574 | 70 | 105 | 76 | 122 | 286 | 301 | 21 | 34 | 14 | 12 | 310 | 1,581 | 7 | 77 | 0 | 0 | 1 | 6 |
| Alaska | 215 | 0 | 24 | 0 | 91 | 0 | 74 | 0 | 15 | 0 | 11 | 0 | 701 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Hawaii | 194 | 174 | 7 | 5 | 23 | 21 | 135 | 122 | 20 | 23 | 9 | 3 | 349 | 175 | 2 | 7 | 0 | 1 | 0 | 2 |
| Canal Zone | 0 | 346 | 0 | 37 | 0 | 72 | 0 | 228 | 0 | 5 | 0 | 4 | 0 | 571 | 0 | 26 | 0 | 0 | 0 | 1 |
| Total continental United States | 80,842 | 150,725 | 10,450 | 21,800 | 20,134 | 45,433 | 42,596 | 70,578 | 2,692 | 10,954 | 4,970 | 1,960 | 43,103 | 260,963 | 200 | 5,625 | 53 | 1,964 | 61 | 1,575 |
| Total United States including Territories | 81,257 | 159,227 | 10,482 | 22,458 | 20,252 | 48,921 | 42,805 | 73,308 | 2,728 | 12,534 | 4,990 | 2,006 | 44,168 | 269,423 | 203 | 5,716 | 53 | 1,969 | 66 | 1,588 |

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[1] Clinics, hospitals, and other institutions. [2] Estimated. [3] Provisional.

Source: PHS FORM 8958–B FSA-PHS—Division of Venereal Disease, Office of Statistics, 11/22/50 (ML-MC) mw.

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# The JOURNAL of VENEREAL DISEASE INFORMATION

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FEDERAL SECURITY AGENCY
Public Health Service

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*Chief, Division of Venereal Disease*

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✦

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# Terramycin in Treatment of Granuloma Inguinale[1]

**Robert B. Greenblatt, M. D.; Wm. E. Barfield, M. D.; Robert B. Dienst, Ph. D.; and Robert M. West, B. S.**

In the therapy of granuloma inguinale the futility of the antimonials has been counterbalanced by the efficacy of the antibiotics. The specificity of streptomycin in treatment is now generally acknowledged (*1–6*). The marked effectiveness of oral medication with aureomycin (*7–12*) and Chloromycetin (*13–15*) is now conceded even by earlier skeptics (*16–18*). Harb (*19*) reported favorable results obtained in seven of nine patients treated with Chloromycetin by the intramuscular route. Sporadic reports of the successful employment of terramycin are beginning to appear (*20, 21*). The purpose of this paper is to report our experiences in the therapy of granuloma inguinale with oral terramycin.

### Methods and Material

From March 7 to November 2, 1950, 32 patients with granuloma inguinale were treated with terramycin. The diagnosis was established in each instance either by tissue spreads, demonstrating Donovan bodies by staining with Wright's stain or pinacyanole (*22*) and/or tissue biopsy (*23*). Most of the patients were hospitalized and were observed over a period of 10 days or longer during treatment. After dismissal from the hospital, follow-up examinations were obtained at various intervals ranging from several to many months.

### Treatment

Thirty-two patients received oral terramycin in total dosages ranging from 20 gm. to 87.5 gm. Twenty-four received 2 gm. daily for a total of 25 gm. Eleven patients were completely healed at the end of treatment. Six were healed at follow-up periods. Of the seven patients who have not been seen since treatment was discontinued, four were 80-percent healed at the end of treatment; two were 40- to 75-percent healed; and one, treated on an out-patient basis, was seen during therapy but failed to return for follow-up. Of the remaining eight patients, two received 20 gm. The remainder received the following doses: 36, 37.5, 50, 62.5, 75, and 87.5 gm., respectively. The dosages in these varied from 2 to 3 gm. daily. Larger daily and total dosages were administered with the more extensive lesions, the largest lesion being approximately 150 sq. cm. Seven of these eight patients were either healed at the end of treatment or on follow-up periods ranging from 1 to 7 months. One patient did not report at the end of therapy. Two recurrences appeared in the group receiving 2 gm. per day for 12.5 days. These two patients were successfully re-treated with an additional 25 gm. of terramycin (table 1). Slight untoward effects were noted in but three patients. Two of these suffered slight nausea and one complained of mild headache on 3 gm. per day. Donovan bodies usually disappeared from the lesions in 4 to 5 days.

One case history is worthy of record:

T. C., a colored male, was referred from the dental clinic of the University Hospital on August 14, 1950. He presented granulomatous lesions of the gums, palate, pharynx, and pubic region. He complained of severe hoarseness. This patient had not eaten anything solid for 4 months, during which time he subsisted on milk alone. The diagnosis of granuloma inguinale was established and the patient was given 500 mg. of terramycin every 6 hours for a total of 50 gm. The response to therapy was most gratifying.

---

[1] From the Medical College of Georgia, Augusta, Ga. Aided in part by a grant from the U. S. Public Health Service.

NOTE: The terramycin used in this study was supplied through the courtesy of Dr. Gladys Hobby, Chas. Pfizer and Co., Inc., Brooklyn, N. Y.

**Table 1.—*Results of terramycin treatment of 32 granuloma inguinale patient***

| Number of patients | Daily dose (gm.) | Total dose (gm.) | Condition at end of treatment | Known recurrences | Follow-up | No follow up |
|---|---|---|---|---|---|---|
| 1 | 2 | 20 | 60-percent healed |  | 1 month—healed. |  |
| 1 | 3 | 20 | Healed |  |  |  |
| 24 | 2 | 25 | 11 healed | 2—successfully re-treated with 25 gm. | 17 healed |  |
| 1 | 2 | 36 | 50-percent healed |  | 2 month—healed. |  |
| 1 | 3 | 37. 5 | Healing |  |  |  |
| 1 | 2 | 50 | Healed |  | 6 month—healed. |  |
| 1 | 3 gm. d. x 12.7 d<br>2 gm. d. x 12.5 d | 62. 5 | Healed |  | 3½ month—healed. |  |
| 1 | 2 gm. d. x 12.5 d<br>3 gm. d. x 16.75 d | 75 | Healing |  | 6 month—healed. |  |
| 1 | 3 gm. d. x 25 d<br>2 gm. d. x 6.5 d | 87. 5 | Healed |  | 7 month—healed. |  |

By the sixth day of treatment the patient was able to eat soft foods, and by the tenth day, solid foods. His hoarseness and general condition improved rapidly. The lesions were completely healed by the end of treatment (25 days), during which time he gained over 20 lbs. in weight. Follow-up examination, 6 months later, showed the patient remained well.

## Conclusions

1. Thirty-two patients with granuloma inguinale were treated with oral terramycin in dosages ranging from 20 to 87.5 gm. The dosage advocated for general use is 2 gm. daily for 12.5 days. Larger doses should be employed with more extensive lesions.

2. Twenty-four patients were either healed at the end of treatment or on follow-up visits. Eight have not been seen since therapy was discontinued. The lesions of all eight were healing when last seen.

3. Slight untoward effects, such as mild nausea and headache, were noted in three patients.

4. Donovan bodies disappeared from lesions after 4 to 5 days of treatment.

5. Terramycin may be added to the list of other antibiotics, streptomycin, aureomycin, and Chloromycetin, as specific agents in the treatment of granuloma inguinale.

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# Local Cortisone Acetate Therapy in Congenital Syphiliti Interstitial Keratitis

## A Preliminary Report [1]

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This is a preliminary report on nine cases of interstitial keratitis due to congenital syphilis in which cortisone acetate was used locally as an eye drop in conjunction with intramuscular injections of procaine penicillin in oil.

### Method

The cortisone acetate was prepared in a 1:4 dilution with normal saline solution and was used as an eye drop in the following manner: Two drops were instilled locally in each eye every hour during the waking hours. The treatment was started at 6 a. m. and was given hourly, with the last medication at 10 p. m., for a period of 10 days. In addition to the cortisone, each patient received 600,000 units of procaine penicillin in oil with aluminum monostearate intramuscularly daily for 12 days. In the daily observation of these patients improvement was usually noted after the first 24 hours.

### Case Reports

*Case 1.*—W. W., a colored female, age 14, gave a history of photophobia, lacrimation, and defective vision for the past 6 months. During that period, the patient had been receiving treatment, consisting of some type of eye drop, for her chronic conjunctivitis. There had been no apparent improvement. Examination revealed that both the right and the left eye had diffuse clouding and cellular deposits of the corneas. There was vas cularization of the cornea with brus formation of the limbus superiorly i both eyes. Associated congenital stig mata were present in the form of Hutch inson's incisors and mulberry-typ molars. The blood Kahn was positiv with a titer 1:512. The spinal flui Kahn was negative; the cell count was 2 but the protein was 56.5 mg. This patien first received typhoid vaccine-fever therapy totaling 72 hours over a period o 3 weeks, and received, in addition, 7,200 000 units of procaine penicillin in oi with aluminum monostearate (PAM) intramuscularly in 12 days. This treatment brought about very little chang in her condition. Cortisone acetate therapy was instituted on October 17, 195 and was discontinued on November Twenty-four hours after this treatmen was begun, improvement was noted; th photophobia, lacrimation, and pain wer subsiding. Daily examinations reveale continued improvement, and the cloudiness and vascularization decreased i severity. When the patient was discharged, all evidence of the interstitia keratitis had disappeared, except a min mal amount of clouding in the centra corneas.

The patient returned on January 1951, and stated that she had no complaints. Examination of the left eye revealed moderate amounts of cellular deposits with a ground-glass appearanc over the central cornea. There was moderate conjunctival injection bilate ally. The right eye showed minima amounts of cellular deposits in the central cornea. Because of the fairl marked conjunctival injection, the patien was re-treated with cortisone acetate for a period of 5 days. The patient was discharged on January 15, showing marked improvement. Observation was to be continued.

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*Case 2.*—E. W., a colored male, age 9, gave a history of defective vision in the left eye, accompanied by pain, lacrimation, and photophobia for a period of 1 month. Past history showed that the patient had a similar occurrence 1 year ago, which cleared without treatment. Slit-lamp microscopic examination of the left eye showed a central opacity with a ground-glass appearance in the cornea, with a few white residual vessels at the left lateral quadrant, and small red vessels at the border of the cornea. Results of Kahn serologic tests made in the referring agency on September 15 and 20, 1950, were 3 plus and 1 plus, respectively. The serologic tests were repeated on December 6 and 7, and both reports were negative. The report from a spinal fluid test was negative, also. Cortisone therapy was started on October 17, and was discontinued on October 23. When the patient was discharged, all symptoms had cleared. There remained a small corneal residual opacity.

*Case 3.*—H. G., a white male, age 11, gave a history of pain, lacrimation, and photophobia for the past several weeks. Previous treatment, in January 1949, consisted of 600,000 units of penicillin, and in 1950, 8,000,000 units of penicillin. The physical examination revealed the following: The left cornea showed much cellular infiltration with active vessels and an increase in the conjunctival vessels; the right eye showed early invasion of the cornea with vessels, but no corneal opacities or cellular deposits; the Kahn serology was positive with a 1 : 2 titer; the spinal fluid was negative. Treatment with cortisone acetate was begun on October 19, 1950, and was discontinued on October 31. When the patient was discharged, a minimal amount of limbal injection was noted. The symptoms of the original complaint had disappeared.

The patient returned on January 14, 1951, and stated that he had no complaints. Examination of the eyes showed very faint diffuse cloudiness over both corneas. No limbal injections or evidence of active interstitial keratitis was noted. The patient was discharged on January 18. Observation was to be continued.

*Case 4.*—J. B., a colored female, age 29, gave a history of no vision in the left eye since 1 year of age and a chronic, persistent photophobia in the right eye. Past history revealed antisyphilitic treatment with arsenic, bismuth, and penicillin in 1946. The physical examination revealed a bilateral clouding with cellular deposits diffused over the corneas of both eyes, most marked over the central area of both. The blood Kahn was positive with a titer of 1 : 1. The spinal fluid was negative. Cortisone therapy was begun on October 20, 1950, and was discontinued on October 31. The patient showed very little improvement as a result of this therapy as far as her sight was concerned. The photophobia was relieved.

*Case 5.*—E. W., a colored female, age 24, gave a history of photophobia, pain, and a disturbance in vision for 2 weeks. Physical examination revealed marked amounts of clouding and cellular deposits over the cornea of the left eye, with vascularization and brush formation at the superior portion of the cornea. The right eye showed moderate amounts of clouding and cellular deposits on the superior portion of the cornea. The blood Kahn was positive with a 1 : 4 titer. The spinal fluid was negative. Cortisone therapy was started on October 30, 1950, and was stopped on November 10. When the patient was discharged, the left eye was clear, and the right eye showed a minimal diffuse opacity of the cornea.

The patient returned on January 17, 1951. She stated that in December she had been ill with what she termed chills and fever and that her original eye disturbance had returned at the same time. Physical examination revealed marked clouding, vascularization, and cellular deposits in the corneas of both eyes. In addition, brush formation was seen in the superior portions of both limbi and active vessels in the central cornea. This condition indicated an exacerbation of her interstitial keratitis. Cortisone acetate therapy was instituted. Twenty-four hours after the initial treatment the conjunctival injection had subsided and treatment response was satisfactory with clearing.

*Case 6.*—W. B., a colored female, age 15, gave a history of defective vision. Physical examination revealed a moderate amount of clouding of the anterior chamber of the right eye without vascularization. The left eye showed a small amount of clouding over the central portion of the cornea. Additional findings were suggestive of Hutchinson-type incisors, mulberry molars, and a high, narrow, palatine arch. The blood Kahn was positive with a titer 1:256. The spinal fluid was negative. Cortisone acetate medication was begun on November 1, 1950, and was discontinued on November 12. When the patient was discharged, there was a marked decrease in the amount of clouding of both corneas.

*Case 7.*—M. S., a colored male, age 12, gave a history of difficulty in vision since 1949. The patient had had treatment with penicillin for interstitial keratitis, but the results had not been satisfactory. Physical examination revealed the following: A moderate ground-glass appearance was seen in the left eye; a few old white vessels, punctate cellular deposits, and old pigment near the center of the cornea were seen; synechiae from a previous iritis were seen bilaterally; the cornea of the right eye revealed a few centrally located punctate deposits; a ground-glass appearance was marked; some active blood vessels were seen in the lower cornea; the conjunctiva was injected; and some arcade formation was seen at the cornea-limbal junction. The Kahn serology was positive with a 1:32 titer. The spinal fluid was positive to the Kahn reaction and had a titer 1:1, the cells numbered 9; and the protein content was 40 mg. Cortisone therapy was instituted on November 2, 1950, and was discontinued on November 13. When the patient was discharged, small amounts of cellular deposits were seen in the lower anterior chamber of the right eye.

*Case 8.*—H. C., a colored male, age 14, gave a history of inflammation, photophobia, and lacrimation for the past 2 months. The past history revealed previous treatment, in December 1949, with fever therapy and 10 million units of procaine penicillin in oil for congenital syphilis with interstitial keratitis. Slit-lamp microscopic examination of the eyes revealed moderate clouding of the anterior chambers of both eyes with some cellular deposits in the central portion of the cornea. The Kahn serology was positive with a titer of 1:8. The spinal fluid was negative. Cortisone therapy was begun on November 21, 1950, and continued until December 2. When th patient was discharged, both eyes were free of the clouding and cellular deposits The photophobia, lacrimation, and pai were gone.

The patient returned on January 3 1951, for reevaluation. He stated tha he had no complaints except for an occasional slight lacrimation. Examinatio of the eyes showed no residual opacities Slit-lamp examination of the right ey revealed some red vessels at the limbu at about 6 or 7 o'clock, which were no infiltrating. The left eye showed som arcade formation on the upper limbu with a few short infiltrating vessels. Th patient was discharged on January Observation was to be continued.

*Case 9.*—E. B., a colored female, age 1 gave a history of 2 months of difficult in vision. Physical examination showe a moderate limbal injection, marked i filtration of the left cornea, and dens patchy, diffuse opacities with cellular d posits, and numerous active vessels i vading the cornea. Definite scarring an ulceration of the cornea were presen The right eye was identically involve Associated congenital stigmata we present as evidenced by a suggesti facies, suggestive incisors, and Moon m rs. The blood Kahn was positive with titer of 1 : 64. The spinal fluid was neg- tive. Cortisone therapy was started on ovember 29, 1950, and was discontinued n December 20. When the patient was ischarged, there was a decrease in the mbal injection; the opacities were less ense; the invading vessels were pale.

## Discussion

Local cortisone acetate therapy has a ronounced therapeutic effect with rapid nprovement in early cases of congenital yphilitic interstitial keratitis. This im- rovement is usually evident in about 24 ours after cortisone therapy has been tarted.

From results of follow-up therapy of ase 5, in which the patient was re-treated or a flare-up, it is obvious that local ortisone therapy can be used successully in cases of recurrence. In general, he use of cortisone may be substituted or fever therapy in the treatment of in- erstitial keratitis both in the acute case nd in the acute recurrent treated case. n addition, there are none of the dangers r discomforts associated with fever ther- py. The local instillation of cortisone s practically painless. Since patients are ot confined to bed during this treatment t could be used to advantage on an out- atient basis, with some individual in- tilling the drops in the eyes.

The medication can be used on persons n any age group, and there are no defi- ite contra-indications to local cortisone herapy in comparison with the paren- eral use of cortisone. Undesirable side ffects can occur in the parenteral use, nd large amounts would have to be used arenterally in order to effect the eye hanges. The cost of local cortisone therapy is, therefore, much less than the cost of the oral or parenteral type of cortisone administration.

Four cases (Nos. 1, 3, 5, and 9) presented typical acute findings of interstitial keratitis as evidenced by vascularity of the cornea, brush or arcade formation, and cellular infiltration. These cases showed very satisfactory and rapid response to cortisone.

Three cases (Nos. 6, 7, and 8) were less acute and showed thickened corneas with sclerosing changes of the posterior layers. In all of these cases there was a definite decrease of cloudiness or opacities and a clearing of symptoms.

In two cases (Nos. 2 and 4) the symptoms were relieved but there was evidently no effect on the opacities. These cases were of long duration and scarring of the cornea was present.

From our observations, it was seen that cases of longer duration derived less benefit than did the early acute cases. Close follow-ups on the patient must be carried out with instructions to return at 3-month intervals for check-up, and to return immediately if the symptoms return. It is possible for symptoms to return after several weeks from the time the drug has been withdrawn.

## Summary

A technic is described for the treatment of congenital syphilitic interstitial keratitis with local instillation of cortisone acetate as an eye drop.

Nine cases were treated and all but one had some beneficial results.

One case had previous treatment with fever therapy and penicillin without results, and another case had previous treatment with penicillin alone without results.

# Relative Effectiveness of Penicillin Therapy in Early and Latent Syphilis in Rabbits

**R. C. Arnold, M. D.,[1] and Charlotte P. McLeod, Sc. D.[2]**

The response of primary and secondary syphilis to curative therapies follows fairly consistent laboratory and clinical patterns. However, the therapeutic effect of a new drug in latent syphilis is not so easily evaluated because of the paucity of measurable clinical or laboratory responses. The advent of intensive therapies, especially the penicillin schedules, has made prolonged and repeated courses of antisyphilitic drugs unnecessary in the treatment of early syphilis. In latent syphilis the time-dose relationship is, as yet, not well understood.

A study of the relative effectiveness of penicillin in the treatment of early and latent syphilis in the rabbit was undertaken, the results of which are described in this paper. These results may give significant clues to the expected reaction in the human.

Directly influencing the selection of total dosage of penicillin and the number of and frequency of injections for this study were the following: That crude penicillin was more effective in latent syphilis than in early syphilis (*1*); and that the responses of early syphilis to different types of crystalline penicillin have varied (*2*), with an unusually high curative value in one specific crystalline penicillin G (*3*).

A total of 115 units of sodium salt of crystalline penicillin G per kilogram of body weight was divided into 24 doses which were injected intramuscularly at 4-hour intervals. The therapeutic solutions were made from the commercial type of crystalline penicillin G sodium salt obtained from two manufacturers.

Aqueous solutions were prepared with sterile distilled water, and the dilute solutions of each preparation (designated A and B) were put in rubber-capped Pyrex bottles and stored at —20° C. until needed. Assays were made for total amount of penicillin to the original bottle and for the final dilutions used in the therapeutic injections, before and after completion of therapy.

The final penicillin dilution was made so that the largest animal would receive 1 cc. and the smaller animals would receive proportionately smaller volumes, administered with tuberculin syringes.

Each rabbit was infected by an injection of an inoculum of *Treponema pallidum* into each testicle. The emulsion of *T. pallidum* contained 4 to 5 organisms per oil-immersion field, and was prepared by mincing syphilitic rabbit testes in a 10-percent serum broth medium. Diagnosis of syphilis in the rabbits was verified by darkfield examination of suspected lesions. Where relapsing syphilis was noted in the treated animals, the diagnosis was confirmed by darkfield examination. Animals showing no evidence of clinical relapse in the weekly posttreatment examinations were killed after 4 months, and gland transfers were made of each animal. Both inguinal and both popliteal lymph nodes of the animal were removed, and the total glandular tissue was implanted in the scrotal pockets of normal rabbits. The gland-transfer animals were observed clinically for at least 100 days. In this study the duration of syphilis was dated from the day the rabbit was inoculated with the *T. pallidum* until the start of therapy. The duration of early syphilis was 30 days, and in latency the range was 4 to 12 months. The duration of latency in 26 of the animals was at least 7 months.

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## Results

The therapeutic responses of animals with early or latent syphilis to two penicillin preparations are shown in tables 1, 2, and 3.

**Table 1.—*Results of treatment of animals with early and with latent syphilis***

| Commercial penicillin preparation used | Number of rabbits treated | Cures |  | Number of treatment failures |
|---|---|---|---|---|
|  |  | Number | Percent |  |
| A | 41 | 14 | 34.15 | 27 |
| B | 44 | 20 | 45.45 | 24 |
| Total | 85 | 34 | 40.00 | 51 |

**Table 2.—Results of treatment of animals *with early syphilis (30 days' duration)***

| Commercial penicillin preparation used | Number of rabbits treated | Cures |  | Number of treatment failures |
|---|---|---|---|---|
|  |  | Number | Percent |  |
| A | 27 | 5 | 18.52 | 22 |
| B | 28 | 8 | 28.57 | 20 |
| Total | 55 | 13 | 23.64 | 42 |

**Table 3.—*Results of treatment of animals with latent syphilis (4–12 months' duration)***

| Commercial penicillin preparation used | Number of rabbits treated | Cures |  | Number of treatment failures |
|---|---|---|---|---|
|  |  | Number | Percent |  |
| A | 14 | 9 | 64.28 | 5 |
| B | 16 | 12 | 75.00 | 4 |
| Total | 30 | 21 | 70.00 | 9 |

Even though the differences are not great, therapeutic preparation B may be sightly more effective than preparation A. If there are significant differences in spirocheticidal properties of the penicillins used in the treatment of experimental syphilis, then the response in clinical syphilis may vary accordingly when a near-minimal therapy is used.

Controls on untreated rabbits were not used because the results of other studies indicate that rabbits harbor syphilis infection for life. Earlier records were reviewed for 44 consecutive untreated animals with early or latent syphilis infection, from which the inguinal and popliteal glands had been removed and implanted in normal rabbits. Of 21 rabbits with early syphilis of from 1 to 3 months' duration, all but one showed evidence of infectiousness when tested by the gland-transfer procedure. Likewise, in a group of 23 rabbits with latent syphilis of 4 to 12 months' duration, only one gland-transfer animal did not develop syphilis. No second passage or transfer was made in either of the two negative animals. Spontaneous cure should be considered in the two apparently negative animals; however, the authors suspect that the gland-transfer procedure failed to demonstrate the presence of a syphilitic infection in the original animal. Gland-transfer methods may give false-negative reports occasionally and this has been noted particularly when the glandular material is divided and the parts are implanted to different animals.

## Discussion

The occurrence of treatment failures in a group of treated subjects poses the question as to why certain animals or patients react differently to the same therapy. It is possible to cure all syphilitic animals in repeated studies if the correct time-dose relationship of penicillin is used. With less effective schedules the failure rate may vary considerably.

Clinical relapses and serologic failures do occur in the human being, the percentage depending on the adequacy of the treatment schedule. Even with as high a failure rate as 50 percent, or even more, the remainder of the patients will be permanently cured by the same treatment schedule. It has been observed clinically that a patient who had had several relapses with the same penicillin preparation and dosage would be cured later when the total amount of penicillin was increased, regardless of whether the same or another penicillin preparation was used. It is possible that the treatment failure, in contrast to the cured animals or patients, may have a substance or a biologic mechanism which reduces the effectiveness of so-called minimal therapy but which could be overcome by an intensified time-dose relationship. It is possible that there may be enhancing or catalytic types of factors which could be used clinically or added to penicillin preparations to increase the total therapeutic effectiveness. If so, this would be especially important in areas of penicillin shortages where minimal schedules must be used to treat syphilis so that the maximum number of infections may be controlled. Unfortunately, these problems are not solved and definitive answers would constitute an important facet to the clinical and public health management of all types of syphilis.

## Conclusions

1. The results suggest that crystalline penicillin G sodium salt may vary in potency although the differences may not be great with the two preparations used in this study.
2. It is significant that latent syphilis responded more favorably to both penicillin preparations than did early syphilis.
3. Patients with latent syphilis may actually need less penicillin treatment than patients with early syphilis.

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# Case Finding of Early Syphilis by the Public Health Nurse

**A. C. Bulla, M. D.,[1] Flora Wakefield,[2] and M. Estelle Hunt[3]**

The primary purpose of the study reported here was to determine the potentialities for syphilis case finding in a generalized public health nursing service. Effort was directed toward utilizing every opportunity for case finding in the clinic and home visit as well as by interview and contact investigation. Emphasis was placed on finding infectious cases of syphilis as early as possible and placing them under treatment.

The Wake County Health Department in Raleigh, N. C., was selected for the study. This joint city-county health department provides public health services for the city of Raleigh, nine small incorporated towns, and the rural areas of Wake County. The county covers 836 square miles and contains approximately 136,000 people divided equally between the city of Raleigh and the rural areas

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About 67 percent of the population is white and 33 percent, Negro. This being the State capital, a large number of the people are employed in governmental work. Although there are no large industrial plants in the county towns, there are many small industries. The rural area—primarily agricultural—is typical of many eastern North Carolina counties. The principal crops are tobacco, cotton, and corn.

### *Medical Services*

The medical staff of the health department consists of one full-time physician who serves as health officer and two dentists, one of whom serves part time. The nursing staff consists of 1 supervising nurse, 13 staff nurses, and 2 clinic nurses. The city and county are divided into districts according to population and health needs. Each staff nurse conducts a generalized public health nursing program which includes school nursing, family health services for communicable disease control, tuberculosis control, venereal disease control, maternal and child health supervision, crippled children supervision, and a bedside nursing program for indigent sick in the city of Raleigh. The two clinic nurses are assigned to the city clinics. There are weekly clinics for tuberculosis examination and prenatal and well-baby care. Three clinics are held each week for venereal disease diagnosis and treatment. For the past 10 years, the health department has operated venereal disease clinics in Raleigh and five incorporated towns in the county. During the time of the survey, January–December 1949, three weekly clinics for venereal disease diagnosis and treatment were held in Raleigh and one weekly clinic for diagnosis and treatment in one of the incorporated towns.

The Raleigh clinic is staffed by physicians who limit their practice to syphilology and dermatology. In the outlying towns in which clinics were located, the staff was composed of a practicing physician who acted as clinician, assisted by the public health nurse who serves the district in which the town is located. During the examination, special emphasis was placed upon medical history, symptoms, and reason for serologic examination. When a physician was in attendance in the clinic, as complete examinations as possible of both male and female patients were made. In the absence of the clinician, it was the nurse's responsibility to secure a sample of blood, take the history, and explain to the patient the need for a complete examination. If the nurse found that further examination was indicated, the patient was referred to a physician of his own choosing or to the Eastern Carolina Medical Center.

The nurse's activities included interviewing for contacts of all patients admitted to the clinic for treatment or referred to the Eastern Carolina Medical Center for treatment. During this clinic session, the nurse drew blood samples on anyone who wanted a test, whether for preemployment or health card. Her activities included taking routine post-treatment serologies and further interpretation of need for follow-up observations.

### Sensitization of Staff

The role of the public health nurse in the control of venereal disease has not been sufficiently emphasized. As a consequence, in many instances the nurse has not utilized the inherent opportunities in the generalized service for case finding of syphilis. Obviously, venereal disease activities are only a part of the services rendered by the nurse as she carried on her generalized program. However, it does seem that she has opportunities to find persons with syphilis if venereal disease activities are integrated with other health services. Specifically, case finding can be accomplished through a recognition of symptoms and a highly developed alertness in history taking in whatever nursing service she may be providing, whether in school, home, or clinic.

Many case-finding studies have emphasized the value of direct epidemiologic investigation as a procedure in uncovering new cases of syphilis. The epidemiologic process involves two distinct steps, the interpretative interview and contact investigation. Through the interpretative interview with a syphilitic patient, information is obtained to locate all persons who have been exposed to syphilis. Effective use of this case-finding tool should increase the nurse's potentiality for finding persons with syphilis if the urgent need for contact investigation can be given its place in the generalized nursing program.

With the advent of effective rapid treatment schedules for syphilis on an ambulatory basis, it may be expected that more persons will go to their private physicians for treatment. Physicians, for the most part, are too busy to interview for contacts or to do the necessary follow-up. Can it be that the public health nurse has a service to offer in the field of interviewing and investigating contacts of infectious syphilis for the practicing physician? If so, the nurse has a golden opportunity to do case finding in an area which might otherwise be lost to medical service.

For the study, a public health nurse with a background of experience in venereal disease control was assigned to work in the generalized public health nursing program. In collaboration with the supervising nurse, in-service instruction was given to sensitize the nursing staff to their part in the venereal disease control program. Throughout the year of the project, eight staff conferences were devoted to venereal disease activities as they related to nursing procedures. These staff conferences emphasized the medical and epidemiologic aspects of the venereal diseases with special emphasis on the new rapid treatment schedules and on diagnostic procedures. Particular attention was given to an evaluation of the epidemiologic approach; both in the interpretative interview and in field investigation. Procedures which the nurse had been using were reevaluated in an effort to obtain all the contacts of each patient, to find these persons as soon as possible, and to persuade them to undergo examination and, if necessary, treatment.

The discussions were also used to assist the nursing staff in making and carrying out plans to visit contacts of early infectious syphilis as they would attend to any other health emergency reported for investigation, such as a case of scarlet fever, diphtheria, or tuberculosis.

In addition to the staff education program, supervisory guidance was given to the staff nurse through individual conferences, observation and demonstration visits in the field, and record supervision.

As many as possible of the staff members attended a 5-day refresher course at the nearby Eastern Medical Center. They reviewed the course with the general staff upon their return.

## Planning Policies and Objectives

Before proceeding with the study, it was necessary to review the work of the health department to determine which procedures were most productive in finding cases of early infectious syphilis. This was done jointly by the health officer, supervising nurse, and staff. The policies established were intended to serve as a guide for the nurse in the interview situation and in the follow-up examination of the contacts:

A. It was recommended that all patients with early infectious syphilis be interviewed by the public health nurse in the local clinic. This included those patients who were going to the Eastern Medical Center as well as those remaining under treatment at the local clinic. Types of persons to be interviewed in order of priority were:

1. Persons diagnosed as having primary and secondary syphilis.
2. Pregnant women with syphilis.
3. Persons diagnosed as having early latent syphilis.
4. Others as time allows.

B. Administrative policies were established to determine when nursing field visits were indicated and when letters should be used in follow-up of contacts.

1. Field nursing visits were recommended to:

(*a*) Contacts of persons with primary or secondary syphilis. (This visit should be made within 24 hours whenever possible, or at least before the time of the next venereal disease clinic.)

(*b*) Any contact believed to be pregnant, or any pregnant woman who has had a positive serology.

(*c*) Children of women who have had syphilis or who had a history of having had syphilis.

2. Use of a letter when information was sufficient:

(*a*) Contacts of early latent syphilis. (If the contact failed to respond to the letter by the next clinic session, a home visit was recommended. When information on contact was insufficient to use the mails, a visit was recommended.)

(*b*) Contacts of late and late latent syphilis were reached by mail whenever possible. (Visits to this group were kept to a minimum.)

C. It was essential to limit the nursing functions in the control program to those activities which were specifically nursing. To this end, written policies were established defining the responsibilities of the clerical staff in the handling of the epidemiologic reports, follow-up letters, and all forms used in the venereal disease control program.

## Application

After definite policies and procedures were established, each nurse continued her daily duties of rendering family health service to the people of her district. Perhaps she was a little more aware of the need in her work for a thorough searching for cases of syphilis, but, by the same token, she never let an opportunity to uncover other health problems go unnoticed.

For the most part, the nurse's functions in venereal disease activities are twofold: clinic procedures and follow-up. While carrying on the routine duties of the clinic, the nurse gradually delegated responsibilities to other workers so she could give more personal attention to the patient, especially during the first visit. She recognized that one of her first responsibilities was to find out why the person came to the clinic:

Did he volunteer because of some clinical evidence?

Did he volunteer without symptoms?

Had he been cited as a contact?

Did he come for a health card?

By being interested in the patient as an individual, the nurse recognized her responsibility in building attitudes that would be favorable toward any counsel she might offer. In addition to her routine clinic duties, the nurse tried to improve her service as an educator and counselor to the patient. She arranged her clinic program to give priority to those persons with emergency health problems. Interviewing was limited to patients with primary, secondary, and early latent syphilis and to all pregnant women with a positive serology. Other persons were interviewed as time permitted.

In her follow-up visits, the nurse arranged her daily schedule to take care of contacts of persons with primary or secondary syphilis and pregnant women having positive serologies in the same manner that she takes care of reported cases of other acute communicable diseases. It was considered desirable to visit contacts of persons with early infectious syphilis within 24 hours, or at least before the next clinic session, but it was only by careful planning of the daily schedule that this could be done. In the city, where the streets are marked and the houses numbered, locating these contacts was not the problem it was in the rural areas. Often the only address given was a rural route number with vague, inaccurate information. The public health nurse in a generalized program not only knows her community but also has the confidence of the people she serves and usually is able to obtain the information she needs by making inquiries and by being alert in her observations.

Many times both health officers and nurse supervisors have asked: Can a nurse in a generalized program render an adequate service in venereal disease activties without interrupting the many other activities for which she is responsible? The following incident may point to an acceptable answer for that question. One of the nurses in the rural area was given 12 epidemiologic reports for investigation. All were on contacts of primary syphilis and, therefore, health emergencies. Within 24 hours after the information was received, the nurse had visited 10 of the 12 contacts and within 2 days the 10 contacts interviewed were under medical supervision. There was some delay in locating the other two contacts. In considering this outstanding piece of follow-up, we may well ask how this was accomplished:

1. The nurse had a good knowledge of her district.
2. Some of the contacts were members of families already under nursing health supervision.
3. The nurse had established a personal professional relationship in the community.
4. The contact information was valid and, even when she didn't know the person named, the information was sufficient to help her locate him.

Another incident may be cited to demonstrate that it is possible to integrate venereal disease services into a well-balanced program. From June 21 to July 30, the names of 80 contacts were given to one of the nurses in a rural area for investigation. Fifty-three of those named were contacts of persons with primary or secondary syphilis; the other 27 were contacts of early latent syphilis. Follow-up efforts were made either by letter or nursing visit to the home, according to the administrative policies of the agency. Many of the named contacts reported to the practicing physicians in the district and to the health department by the next clinic session. Because the clinic activities involving patient education, interviewing, and contact examination became very heavy, another nurse was assigned to help in the clinic.

This was truly a challenge to a nurse carrying on a generalized nursing service. Fortunately, the time this small epidemic occurred was most opportune as schools were closed for summer vacation and the typhoid clinic activities were over by the end of June. While particular stress was placed on locating these contacts, the nurse carried on her maternity program, adult health supervision, orthopedic service, and infant supervision in the home and clinic. Although the minor epidemic was given much attention, the nurse was not unmindful that this service was but one in the total program and planned her work accordingly.

The following tables reflect the effectiveness of nursing service in case finding through the interpretative interview and efficient follow-up.

**Table 1.—*Result of investigation of contacts referred from all sources***

| | | | |
|---|---|---|---|
| Number referred | | | 254 |
| Contacts examined | | 209 | |
| Not infected | 127 | | |
| Brought to treatment | 61 | | |
| Already under treatment | 21 | | |
| Contacts not examined | | 45 | |
| Not located | 19 | | |
| Out of jurisdiction | 14 | | |
| Insufficient information | 12 | | |

**Table 2.—*Results of contact investigation on cases of primary and secondary syphilis (contacts obtained by interview in health department)***

| | | | |
|---|---|---|---|
| Number of previously untreated cases of primary and secondary syphilis | | | 59 |
| Number of contacts obtained | | | 179 |
| Contacts examined | | 154 | |
| Brought to treatment | 55 | | |
| Already under treatment | 20 | | |
| Not infected | 79 | | |
| Contacts not examined | | 25 | |
| Not located | 10 | | |
| Out of jurisdiction | 15 | | |
| Diagnosis of the contacts brought to treatment | | 55 | |
| Primary syphilis | 7 | | |
| Secondary syphilis | 20 | | |
| Early latent syphilis | 24 | | |
| Late latent syphilis | 2 | | |
| Congenital | 2 | | |

Efforts were made to determine the time interval between the date the epidemiologic report forms were received at the health department and the time the contacts were first reached. Of the 209 contacts investigated the time interval was as follows:

| *Number of contacts reached* | | *Time interval* |
|---|---|---|
| 138 | days | 1–3 |
| 177 | do | 4–7 |
| 191 | do | 8–14 |
| 200 | do | 15–30 |
| 209 | months | 1–6 |

A record was made of the time interval from the date the information on each of these 209 contacts was received in the health department until the time the named contact was under medical supervision. Of the 209 investigated:

| *Number of contacts* | | *Time interval* |
|---|---|---|
| 77 | days | 3 |
| 127 | do | 7 |
| 155 | weeks | 2 |
| 192 | months | 1 |
| 209 | do | 6 |

Contacts were reached by home visit, telephone, or letter. The following figures reflect in a general way the nurses' efforts to encourage contacts to seek medical supervision:

| *Method of reaching contacts* | *Number of contacts reached* |
|---|---|
| Letter | 19 |
| Home visits (number required): | |
| 1 | 107 |
| 2 | 36 |
| 3 | 12 |
| 4 | 8 |
| 5 | 3 |
| 6 | 2 |
| No home visit required (already under observation or treatment) | 22 |

Previous mention was made of finding syphilis through other nursing services while carrying on routine nursing activities. Through home visits and routine serologic tests for syphilis, at first visit and again at 7 to 8 months, 37 pregnant women were found to have positive serologies. Of these:

11 were brought to treatment for the first time.

16 had previous treatment but needed further treatment for this pregnancy.

10 had previously been adequately treated.

Through routine school examination and health supervision in the home six other cases of syphilis were found.

One case was discovered through well-baby service. While taking the history of the newborn, the nurse inquired into the mother's serology during pregnancy. The mother stated that her physician had taken a test for syphilis but she had not received a report. The nurse contacted the physician and learned that this mother had a positive serology but the physician had been unable to locate her. Further examination was made. The diagnosis for the mother was confirmed; and the infant was diagnosed as having congenital syphilis.

Two other children with syphilis were discovered during routine school examination. In one instance the child had symptoms of "falling hair" which had been diagnosed as ringworm by the practicing physician. The health officer in making further examination of this child requested that a serologic test be taken. It was reported to be positive. Follow-up was made in the home and the mother also was found to have syphilis. Both were placed under medical care. In a routine vision screening in the school, a child was found to have interstitial keratitis. Through home follow-up the mother was found to have a positive serologic test. Both mother and child were placed under medical care.

## Other Case-Finding Efforts

Consideration was given to case finding through agencies outside the health department, i. e., private physicians and hospitals. Visits were made to some of the practicing physicians to offer the services of the department in locating contacts of infectious cases. Staff nurses were provided to aid in interviewing any of the infectious patients the physician might select. Because of the small staff, this service was limited. Although few of the physicians used the interview service, several physicians interviewed their own patients and gave the nurse in the district the contact information for follow-up investigation. Through this exchange of information, the nurse encouraged some patients to seek medical supervision when they might have been lost to medical care.

In one instance where the physician accepted the services of the health department, the results were so significant that the physician presented a paper before the local medical society. He stressed the need for closer relations between the health department and private physicians, and the need for examining the facilities for case finding that the health department may offer the busy physician.

Special effort was made to contact clinics and hospitals in the area in order to show them the services and facilities of the health department for the control of the venereal diseases.

## Some Provocative Results

The nurse in a generalized public health nursing service works with families. Her concern is with the health of these families and with anything that affects the health of any of their members. As she renders a comprehensive service, her responsibility in the control of the venereal diseases cannot be overlooked. If one member of the family has a venereal infection, the whole family may be affected. Since the function of a public health nurse is to render service to the family as a unit, the range of her activities should extend to a recognition of any other problem which may be present.

A few incidents may illustrate some of the other health problems that are uncovered through home nursing visits in the interest of venereal disease activities.

Recently, a contact of a person with secondary syphilis was named in a family which the nurse was providing with antepartum service. Her visit was well accepted because of the past services she had given the family. This household consisted of several families living together. While making the visit to the cited contact, the nurse realized that this might be the brother of a young unmarried girl who had been called to her attention by the school principal, who believed the girl to be pregnant. Through information received from the brother, the schoolgirl was located and placed under medical supervision. During the visit, the nurse found a 1-month-old infant, a 7-month-old infant, an 8-month-old infant, and a 3-year-old preschool child. The 1-month-old infant was admitted to nursing service and the other two infants and the preschool child were started on immunization in the home which was completed in the clinic. In summary, as a result of this one visit made in the interest of venereal disease control, the nurse found and brought to nursing service the syphilis contact, three infants, one preschool child, and one pregnant schoolgirl.

In another instance, while the nurse was helping the midwife fill out a birth certificate, she learned that a recently delivered mother had not received any medical care during her antepartum period, nor had she had a serologic test for syphilis. Arrangements were made with the midwife for the mother to get a serologic test for syphilis. When she visited the mother, the nurse found a malnourished, underweight infant of 2 months having a subnormal temperature. The nurse called the physician, who visited the home and immediately referred the infant to the hospital. The baby presented a serious feeding problem and upon its discharge from the hospital the public health nurse, through supervision and teaching of the mother, helped with the care of the infant. The attending physician later stated that this infant might have died if it had not been found and given medical care. Further examination and repeated serology on the mother ruled out syphilis.

In another instance, the nurse was visiting a school child who had primary tuberculosis. While making the visit, she noticed that the mother of the child was pregnant. During the recital of the family history the woman stated, "I've always had bad blood." This, of course, could mean little or much, but it did alert the nurse to the urgency of immediate medical care. After several visits had been made and the mother still had failed to seek medical care, the nurse took a sample of her blood for analysis. The results showed a positive Kahn test. Plans were made for her to go to Eastern Medical Center for evaluation. Following delivery, the infant was admitted to nursing service for follow-up care.

One nurse, while visiting a family in the interest of venereal disease, was called by a family next door to visit a premature infant who weighed 2 pounds 13 ounces. The nurse made arrangements for hospital care of the baby.

In other instances the nurses found children who needed immunization, adults who wanted X-rays, or someone who wanted help in another health problem. So, it would seem that, as the nurse carried on her venereal disease service, her interest is not restricted to venereal disease but may extend to any of the other health problems which are found in the home.

## Summary

With the advent of the use of antibiotics, the pattern in treatment has changed many aspects of venereal disease control. The advantages of the interpretative interview in early case finding and effective follow-up, however, remain the same. All avenues of approach should be used in an effort to find and treat syphilis in the early stages. In considering means of achieving this goal, the valuable contribution the public health nurse in a generalized nursing program has to offer must not be overlooked.

From this study it was apparent that the public health nurse in a generalized public health nursing program has potentialities for syphilis case finding. In considering procedures through which the nurse can make a more valuable contribution, the following conclusions were reached:

1. In order to function with professional competence, it is essential that well-defined, written policies be adopted regarding the nurse's function in venereal disease activities as related to the public health program.

2. In the development of effective case-finding procedures, the interpretative interview should be given primary consideration.

3. Promotion of continuous in-service education is essential to improve nursing participation in venereal disease activities through adding to the nurse's professional knowledge and skills in interview and contact investigation.

4. Contact investigation of early infectious syphilis should be given the same priority as other health emergencies in the total program.

5. Continued emphasis should be placed on obtaining referrals from private physicians and hospital clinics of patients with infectious syphilis for interview and contact location.

6. A workable system for exchange of information between the clinic and field through the use of nursing records is essential.

# CURRENT NOTES AND REPORTS

## International Union Against the Venereal Diseases Plans Meeting

The 28th General Assembly of the International Union Against the Venereal Diseases will be held in Paris, France, May 21–23, 1951.

The meetings will be held at the Institute Fournier.

On May 21st, reports from the President, Dr. E. H. Hermans, Netherlands, and from the regional offices will be given.

The 22d and 23d will be given over to a Joint Conference on Sex Education. Four discussion groups will deal with (*a*) physiologic and pathologic factors of sex education; (*b*) the psychologic and pedagogic factors; (*c*) the factors of ethics, religion, race, and climate; and (*d*) fields of activity.

On Thursday, May 24th, a ceremony will commemorate the fiftieth anniversary of the founding of the French Moral and Sanitary Prophylaxis Society by Alfred Fournier.

Clinical tours of Lyons and Turin will be conducted during the following 6 days.

# CURRENT LITERATURE

A. M. A. ARCH. DERMAT. & SYPH., CHICAGO

A study of syphilis in northern Alberta. Harold Orr and Paul L. Rentiers. A. M. A. Arch. Dermat. & Syph., 63: 85–90, Jan. 1951.

A mass blood testing of inhabitants of an area covering 40,000 square miles, starting in 1944 and taking 14 months for completion, showed 145 positive reactions out of 1,300 tests made. These 145 were brought together in a tent camp for treatment. Of 99 patients followed, 84 percent became negative. This epidemic began with the arrival of labor troops working on the Alaskan Highway.

Effectiveness of penicillin in the prevention of congenital syphilis. Loren W. Shaffer and Charles J. Courville. A. M. A. Arch. Dermat. & Syph., 63: 91–103, Jan. 1951.

Of 631 pregnant women delivered during 1948 and 1949 who were treated with penicillin either before or during pregnancy at the Social Hygiene Clinic of the Detroit Department of Health, the incidence of abortions, miscarriages, stillbirths, and neonatal deaths closely paralleled that reported for nonsyphilitic pregnancies. Five infants, one stillbirth, and one neonatal death were classified as syphilitic. Of these, the neonatal death and congenital syphilis in four of the infants were due to relapse or reinfection in women who failed to remain under observation.

Treatment of early syphilis with penicillin, Mapharsen and bismuth (combined therapy). Louis Chargin, Nathan Sobel, and Theodore Rosenthal. A. M. A. Arch. Dermat. & Syph., 63: 104–114, Jan. 1951

In the clinics of the Department of Health, City of New York, a treatment schedule of 6,000,000 units of penicillin 10 to 20 injections of oxophenarsine hydrochloride, and 10 injections of bismuth subsalicylate, was employed in 470 patients with early syphilis. In comparing results from this schedule with those secured with the 16-day schedule of penicillin alone, satisfactory outcome was about the same. The outstanding difference was the low relapse rate of 0.85 percent with the combined therapy compared with 3.9 percent with the 16-day plan.

## A. M. A. ARCH. NEUROL. & PSYCHIAT., CHICAGO

Visual function in perimetrically blind fields. Morris B. Bender and Howard P. Krieger. A. M. A. Arch. Neurol. & Psychiat., 65: 72–79, Jan. 1951.

At the Department of Neurology and Psychiatry, New York University-Bellevue Medical Center, the visual fields of 11 patients with lesions of the optic pathways were studied under conditions of daylight and darkness. In two of these patients the lesions were due to syphilis. Detailed results are presented.

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## A. M. A. ARCH. OPHTH., CHICAGO

Clinical trial with chloramphenicol in ocular infections. Irving H. Leopold. A. M. A. Arch. Ophth., 45: 44–52, Jan. 1951.

Chloramphenicol was found helpful in various forms of ocular infections when used systemically and locally. One patient with gonococcic conjunctivitis improved when the drug was given systemically.

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## ACTA MED. PHILIPPINA, MANILA

Congenital neurosyphilis. Artemio P. Jongco, Ramon S. Chikiamco, and Mercedes S. Victoria. Acta med. Philippina, 7: 29–38, July–Sept. 1950.

The literature is reviewed, and case reports are presented of five Filipino children with congenital neurosyphilis. Of these, three gave definite clinical evidence of the disease, and two were latent or asymptomatic.

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## ACTA MED. SCANDINAV., STOCKHOLM

Renal blood flow and glomerular filtration rate in patients with valvular heart lesions. E. Blegen and K. Aas. Acta med. Scandinav., 138: 391–412, Fasc. 6, 1950.

The authors compare renal blood flow and glomerular filtration rate with type and degree of heart failure in different valvular lesions. Material for the study consisted of 8 normal individuals and 37 patients with cardiac disease, including syphilis. Detailed results are presented.

## ACTA DERMAT.-VENEREOL., STOCKHOLM

The febrile Herxheimer reaction in early infectious and latent syphilis treated with penicillin. Tauno Putkonen and Katri Rehtijärvi. Acta dermat.-venereol., 30: 503–506, No. 6, 1950.

Results from a study of Herxheimer reactions in 127 patients treated at the Kumpula Hospital, Helsinki, since the end of 1947, are presented. It was found that a febrile reaction begins to appear in syphilis during the seronegative primary stage, is regularly present in seropositive primary syphilis, and is probably most intense in the late primary or in early secondary cases. Because of the small number of cases observed in this study, authors feel that the results should be confirmed.

Follow-up of syphilitics. Late manifestations in 467 male patients with early syphilis followed for 29–36 years. Johannes Peter Nielsen. Acta dermat.-venereol., 30: 507–512, No. 6, 1950.

Follow-up studies were made on 467 males admitted to the University Clinic of Dermato-Venereology of the Rigshospital in Copenhagen between 1913 and 1920 for treatment of primary or secondary syphilis. Tables are presented showing total number of cases with manifestations of late syphilis, incidence of general paresis in the original group of patients, and the interval between the time of infection and diagnosis of late syphilis.

Morbidity of syphilis in Sweden. Malcolm Tottie. Acta dermat.-venereol., 30: 513–515, No. 6, 1950.

To the author's knowledge, there are no reliable statistics on the morbidity of syphilis in Sweden. It is estimated, however, that about 35,000 cases of syphilis in the infectious stage have been reported between the years 1919 and 1948. Estimated incidence and morbidity rates among various age groups are discussed.

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## AM. J. MED., NEW YORK

Syphilitic cardiovascular disease combined with chronic endocardial lesions usually attributed to rheumatic fever. John R. Smith, John A. Saxton, Jr., and Herbert C. Fritz. Am. J. Med., 10: 37–46, Jan 1951.

From a review of the literature, 47 instances of syphilitic cardiovascular disease combined with chronic endocardial disease, probably rheumatic in origin, have been noted. Among 398 autopsy specimens of syphilitic cardiovascular disease and 459 specimens showing rheumatic heart disease at the St. Louis City Hospital, there were 8 specimens exhibiting combined lesions judged to be of probable rheumatic origin. It is emphasized that the possibility of coexistent syphilitic rheumatic heart disease must be considered when overlapping evidence of either of the diseases is discovered clinically.

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AM. J. OPHTH., CHICAGO

Recent advances in ocular therapy. Joseph J. Fried. Am. J. Ophth., 33 : 1881–1890, Dec. 1950.

Therapeutic measures suggested during the past 5 years for the treatment of eye diseases, including those due to gonorrhea and syphilis, are reviewed.

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AM. J. PATH., ANN ARBOR

The transmissible venereal tumor of the dog. Studies indicating that the tumor cells are mature end cells of reticuloendothelial origin. Frank Bloom, George H. Paff, and Charles R. Noback. Am. J. Path., 27 : 119–139, Jan.–Feb. 1951.

In this study material from a spontaneous transmissible tumor in an adult, female, German shepherd dog was transplanted to four other male and female dogs, from which further transplants were made to four more dogs. From a review of the literature concerning origin and classification of the tumor cells and from morphologic, cytologic, histochemical, and tissue culture studies of the transplants, the authors conclude that the tumor cell is a mature end cell of reticulo-endothelial origin and suggest that the designation "transmissible venereal tumor" be retained.

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AM. J. PUB. HEALTH, NEW YORK

Role of the laboratory in the prevention of irreparable injury in neurosyphilis. Carl Lange and Albert H. Harris. Am. J. Pub. Health, 41 : 168–175, Feb. 1951.

Diagnosis, treatment, and prevention of severe sequelae of neurosyphilis are discussed. Optimum laboratory methods and adequately controlled treatment schedules combined with effective case finding and case holding should result in a considerable reduction in the present incidence of paresis.

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AM. J. TROP. MED., BALTIMORE

Aureomycin in the treatment of yaws. Elmer H. Loughlin, Aurèle Joseph, and Katherine Schaeffer. Am. J. Trop. Med., 31 : 20–23, Jan. 1951.

In this study, begun in January 1950 at the Hôpital Général, Port-au-Prince, Haiti, 30 West Indians with yaws in various stages were treated with 10 gm. of aureomycin administered orally. Authors feel that the gratifying results obtained with this treatment suggest that if a comparable dose of the drug could be administered intramuscularly in a repository form a more efficient therapy for the mass treatment of yaws might be achieved.

The effect of orally administered aureomycin on *Treponema pertenue* in man. Katherine Schaeffer, Elmer H. Loughlin, and Aurèle Joseph. Am. J. Trop. Med., 31 : 24–25, Jan. 1951.

Morphologic changes in *Treponema pertenue*, obtained from primary and secondary lesions of 20 patients treated with aureomycin for yaws and observed with the phase-contrast microscope, are described and compared with the appearances of normal treponemes removed from the same or similar lesions prior to therapy. In view of the easily demonstrable changes and the easily visible reduction in their numbers, the authors now use the phase-contrast microscope routinely in evaluating substances used in the treatment of yaws.

Phase contrast microscopy for demonstration of *Treponema pertenue* in yaws lesions. Elmer H. Loughlin, Aurèle Joseph, and Katherine Schaeffer. Am. J. Trop. Med., 31 : 26, Jan. 1951.

Normal morphologic appearances of *Treponema pertenue* as observed with the phase-contrast microscope are described. A Winkel-Zeiss phase-contrast microscope with the 90 X condenser phase ring and 90 X oil-immersion phase objective was used for this study.

### AM. PRACT. & DIGEST. TREAT., PHILADELPHIA

Clinical aspects of gynecologic endocrinology. Edwin Matlin. Am. Pract. & Digest. Treat., 2 : 70–75, Jan. 1951.

The author deplores the indiscriminate use of hormones and presents some basic facts essential to the rational treatment of gynecologic endocrine dysfunction. Treatment of the more common disorders, including gonorrheal vulvovaginitis, is discussed.

### ARCH. DIS. CHILDHOOD, LONDON

Reiter's syndrome in childhood. Beryl D. Corner. Arch. Dis. Childhood, 25 : 398–403, Dec. 1950.

The literature is reviewed, and a case report is presented of a typical, fairly severe case of Reiter's syndrome in an English boy aged 9 years. The disease in childhood appears to be a rarely noted condition.

### ARIZONA MED., PHOENIX

Gonorrhea acquired via rectal intercourse: a case report. Robert A. Greene and Edward L. Breazeale. Arizona Med., 7 : 48–49, Nov. 1950.

A case report is presented of gonococcic urethritis in a young Indian male, which was proved clinically, bacteriologically, and legally as having been acquired through rectal coitus with another male Indian. *Neisseria gonorrhoea* were recovered from the urethra of the young boy and from the anus of the other male Indian.

A health officer looks at a mental hygiene program. J. P. Ward. Arizona Med., 7 : 55–63, Dec. 1950.

Various reasons are advanced to emphasize the importance of a mental hygiene program. The author discusses the health officer's contribution to the mental health program and its relationship to other programs, including venereal disease and tuberculosis control.

### BROOKLYN HOSP. J., BROOKLYN

Breast: gumma masking as a cancer. Silk H. Polayes. Brooklyn Hosp. J., 8 : 168–169, Third Quarter, 1950.

A case report is presented of a 68-year-old white woman on whom a large foul-smelling ulcerated mass in one breast was diagnosed as carcinoma. Following mastectomy, histologic findings suggested syphilis. Subsequent serologic reactions were strongly indicative of syphilis.

### BULL. POST-GRAD. COMM. MED., UNIV. SYDNEY, SYDNEY

The effects of some internal diseases and disturbances of the intra-uterine environment on the foetus and new-born. Charles Lee. Bull. Post-Grad. Comm. Med., Univ. Sydney, 6 : 143–149, Sept. 1950.

Among the infections which affect the fetus and newborn, the author discusses syphilis. The importance of early diagnosis and treatment of the mother is stressed.

### CANAD. NURSE, MONTREAL

Penicillin versus silver nitrate. Helen Claire Howes. Canad. Nurse, 47 : 28–29, Jan. 1951.

The author reviews several reports which have appeared in recent medical literature on the advantages of using penicillin rather than silver nitrate preparations as a prophylactic procedure against ophthalmia neonatorum.

### CHRON. WORLD HEALTH ORGAN., GENEVA

Serology of syphilis. Chron. World Health Organ., 4 : 367–369, Dec. 1950.

An essential aim in the diagnosis of syphilis is the standardization of serologic technics at both national and international levels. The Subcommittee on Serology and Laboratory Aspects during its second session in Paris felt that it should devote the greater part of its work to advising WHO on the problems to be solved in attaining this objective. Among other subjects, the question of antigens based on cardiolipin, and studies on *Treponema* were discussed.

CONNECTICUT HEALTH BULL., HARTFORD

Safeguard infants from congenital syphilis. Connecticut Health Bull., 65 : 3–4, Jan. 1951.

Connecticut State law requiring physicians to make prenatal blood tests for syphilis and to note it on the birth certificate is briefly discussed.

Cardiolipin tests for syphilis available throughout Connecticut beginning March 1, 1951. Connecticut Health Bull., 65 : 5, Jan. 1951.

With the substitution of the VDRL test for the Mazzini test and the Kolmer cardiolipin complement-fixation test for the Connecticut complement-fixation test, the Bureau of Laboratories of the Connecticut State Department of Health will begin the routine use of cardiolipin-lecithin-cholesterol antigens in the performance of tests for syphilis.

CONNECTICUT M. J., HARTFORD

Report of study of complications shown on birth certificate supplement. State Department of Health. Connecticut M. J., 15 : 148–152, Feb. 1951.

Analysis of incidence of complications of pregnancy and labor as recorded on supplements to birth certificates in Connecticut during 1948 showed that among 39,535 live births 36 had complications due to syphilis. Among 528 stillbirths, 4 such cases were reported.

DELAWARE STATE M. J., FARNHURST

Report of the Committee on Social Hygiene. Transactions : House of Delegates, October 2, 1950. Delaware State M. J., 22 : 343, Dec. 1950.

Among the reports presented at the meeting of the House of Delegates of the Medical Society of Delaware was one by the Committee on Social Hygiene. The report stated that venereal disease control in the State was well organized, the downward trend in syphilis was continuing, new cases of gonorrhea had not declined as much as syphilis, recent premarital legislation had been profitable, and all physicians should be careful to obtain prenatal serologic tests.

DIS. NERV. SYSTEM, NEW YORK

Lobotomy in the management of intractable pain and narcotic addiction. Edmund A. Smolik. Dis. Nerv. System, 11 : 327–331, Nov. 1950.

The author presents the results of prefrontal lobotomy in a series of 20 patients suffering from intractable pain. Three cases were reported in detail. One of these was a 57-year-old male with intractable pain of tabetic origin. The lobotomy produced relief of pain and also resulted in an alteration in personality to such a degree that the patient was much more socially acceptable.

EAST AFRICAN M. J., NAIROBI

Hepatitis in the African. A clinical investigation of an outbreak of acute jaundice June 1948–November 1949. B. O. Pepper. East African M. J., 27 : 317–324, Aug. 1950.

A minor outbreak of 44 cases of acute jaundice in Africans is described, and its possible etiology is discussed. In one group of 28 patients with arsphenamine hepatitis, all were undergoing treatment for syphilis. Of 10 patients with acute toxic hepatitis, 1 had syphilis, and of 6 patients with infective hepatitis, 1 had syphilis and 2 were questionable.

The treatment of gonorrhea. N. R. E. Fendall. East African M. J., 27 : 328–331, Aug. 1950.

The purpose of this investigation was to determine the smallest effective dose of penicillin oil emulsion in the treatment of gonorrhea. In a study of 3 series of 654, 67, and 100 cases, respectively, a dosage of 170,000 units was found to be 98-percent effective. For large-scale use on a highly infected indigenous population, one injection of the order of 0.2 mega unit is recommended.

HAHNEMANNIAN, WEST PITTSTON

The antibiotics. Franklin C. Massey. Hahnemannian, 85 : 200–206, Oct.–Dec. 1950.

The author reviews the available antibiotics, the therapeutic spectrum of each, and certain specific disadvantages of the antibiotics, including allergy, depotentiation, renitency, neurologic complications, alimentary canal irritation, and costliness.

### HEALTH NEWS, ALBANY

Community health activities. Erie County has comprehensive venereal disease educational program. Clifford M. Hodge. Health News, 28: 13–15, Jan. 1951.

A 2-year report on the venereal disease education program of the Erie County Health Department is presented. Development and production of educational materials for patients and a survey of venereal disease control practices in business and industrial firms were stressed in the program.

### ILLINOIS HEALTH MESSENGER, SPRINGFIELD

Safeguard our stronghold—the family. Illinois Health Messenger, 23: 9–10, Feb. 1, 1951.

While penicillin rapidly cures most cases of venereal disease, it does not solve the problem. Syphilis remains a problem because of the nature of the disease. Personal morals and public conscience are the true preventives. Because of the war crisis, people need added protection which can be accomplished through education of the family.

### J. A. M. A., CHICAGO

The battle against blindness. Walter B. Lancaster and Franklin M. Foote. J. A. M. A., 145: 26–30, Jan. 6, 1951.

History and work of the National Society for the Prevention of Blindness is reviewed. The decline in blindness from ophthalmia neonatorum among new admissions to schools for the blind from 28 percent in 1908 to 2.2 percent in 1948 is attributed to legislation, educational activities, and better medical treatment. Case finding through widespread serologic tests for syphilis and better treatment probably are responsible for the 50-percent decrease in syphilis as a cause of blindness among children in schools for the blind since 1936.

Health problems in Alaska. J. A. M. A., 145: 108, Jan. 13, 1951.

Dr. Haldeman reported on general health problems. The incidence of syphilis is lower in Alaska than previously thought. Serologic surveys conducted in some villages failed to disclose a single person infected with syphilis. Morbidity reports of the Alaska Department of Health indicated that once syphilis is introduced into a village, it frequently assumes epidemic proportion.

Adie's syndrome: A benign disorder simulating tabes dorsalis. Arthur B. Kern. J. A. M. A., 145: 230–231, Jan. 27, 1951.

In this discussion the characteristic signs of Adie's syndrome and the differences between the tonic pupil and the Argyll Robertson pupil are described. A case of the syndrome in a 27-year-old woman which was misdiagnosed as tabes dorsalis is reported.

Venereal disease statistics. Norway. Foreign Letters. J. A. M. A., 145: 249, Jan. 27, 1951.

Before World War II, 5,000 to 6,000 cases of gonorrhea and 300 to 400 cases of syphilis were reported annually in Norway. In 1949, 3,440 cases of gonorrhea and 846 cases of syphilis were reported. Thus, while the gonorrhea rate in 1949 was much lower than before the war, the syphilis rate was much higher.

### J. IMMUNOL., BALTIMORE

The indirect complement fixation, hemagglutination and conglutinating complement absorption tests for viruses of the psittacosis-lymphogranuloma venereum group. M. R. Hilleman, D. A. Haig, and R. J. Helmold. J. Immunol., 66: 115–130, Jan. 1951.

Three new serologic technics for demonstrating antibody against these viruses in the serums of humans and chickens are described in detail and their merits and demerits as compared with the ordinary complement-fixation test are reviewed. For the diagnosis of lymphogranuloma venereum in man, the ordinary complement-fixation test was found more satisfactory than either the conglutinating complement absorption or the hemagglutination tests.

### J. Immunol., Baltimore—Continued

Mazzini cardiolipin microflocculation test for syphilis. L. Y. Mazzini. J. Immunol., 66: 261–275, Feb. 1951.

An adaptation of cardiolipin antigen to the Mazzini technic is described whereby the use of 0.03 ml. of serum instead of the usual 0.05 ml., the addition of 1 drop (0.05 ml.) of 0.9-percent sodium chloride solution following the primary rotation, and the rerotation of the test for an additional 4 minutes at a slower speed, will bring about resolution of the zonal reactions. Applications of the test to spinal fluid has been accomplished without altering either the stability of the antigen emulsion or the spinal fluid which would seem to indicate that the test is of real value in the diagnosis and treatment of neurosyphilis either as an adjunct to the complement-fixation test or independently.

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### J. Iowa M. Soc., Des Moines

Congenital syphilis. State Department of Health. Walter L. Bierring. J. Iowa M. Soc., 41: 64–65, Feb. 1951.

Case finding and treatment of women of the childbearing age and establishing methods for early diagnosis of syphilis in babies are considered two approaches to the problem of controlling and decreasing the incidence of congenital syphilis.

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### J. Kentucky, M. A., Bowling Green

Chronic hoarseness. Gordon L. Green. J. Kentucky, M. A., 49: 5–8, Jan. 1951.

Some of the important causes of hoarseness are discussed. Syphilis of the larynx usually occurs as the tertiary type and is a cause of chronic hoarseness in adults. It is characterized by gummatous nodules, ulcers, and perichondritis followed by fibrosis and stenosis. Diagnosis is made by serologic test.

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### J. M. A. Alabama, Montgomery

Clinical symposium on present day use of antibacterial and chemotherapeutic agents. Part II—The drug of choice. Allen E. Hussar and Howard L. Holley. J. M. A. Alabama, 20: 242–250, Jan. 1951.

The purpose of this section is to present to the clinician the present-day consensus as to which antibiotic is the drug of choice, the second drug of choice, and where necessary, combinations of drugs to be used in treatment of various infections, including gonorrhea, granuloma inguinale, prenatal syphilis, neurosyphilis and *Trichomonas vaginalis*.

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### J. Michigan M. Soc., Lansing

The present status of the problem of syphilis. Louis A. Brunsting. J. Michigan M Soc., 50: 48–53, Jan. 1951.

Discovery of penicillin, educationa programs, rapid treatment centers, cas finding, diagnosis, dosage schedules, an treatment are discussed as factors whic have contributed to the decline in th incidence of syphilis in recent years.

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### J. Nat. M. A., New York

Origin of the term venereal disease. J. Nat M. A., 43: 40, Jan. 1951.

Venereal disease was observed for th first time in the French Army when Kin Charles VIII invaded the kingdom o Naples; the Italians called it the Frenc evil, while the French called it th Neapolitan evil. Since a disease shoul be named according to its cause, it i rightly called venereal disease (morbu venereus).

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### J. Trop. Med., London

Ghoul hand. D. B. Jelliffe. J. Trop. Med 53: 238–240, Dec. 1950.

Results of a clinical investigation of 2 cases of ghoul hand observed in the out patient department in Ibadan, Nigeri are presented. Author feels that while i is difficult to prove beyond doubt tha these cases are, in fact, due to tertiar yaws alone, nevertheless, the results o the investigation would seem to indicat that this is probable.

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### M. Ann. District of Columbia, Washington

Fundamentals of tumors. V. J. Dardi M. Ann. District of Columbia, 20: 14–2 58, Jan. 1951.

M. ANN. DISTRICT OF COLUMBIA, WASHINGTON—CONTINUED

In this general review of the fundamental knowledge of tumors, mention is made that chronic granulomas have been found preceding tumor development, such as cancer of the tongue and sarcoma of the bone following syphilis.

Gonococcal septicemia. Report of a case. Harold L. Hirsh and Walter Kurland. M. Ann. District of Columbia, 20: 81–82, Feb. 1951.

Case history is presented of gonococcic septicemia because of its rarity and the ease of confusion with meningococcic infection unless adequate bacteriologic studies are undertaken. Patient was a 30-year-old Negro woman who was discharged on the twentieth hospital day completely recovered.

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M. J. AUSTRALIA, SYDNEY

Aureomycin in intractable non-specific urethritis. W. McL. Thomson. M. J. Australia, 1: 149–150, Jan. 27, 1951.

Effects of aureomycin in treatment of six cases of urethritis, two of which also had gonorrhea, are described. All six patients were treated successfully with oral administration of 2,000 mg. of aureomycin after treatment with penicillin and other means had failed.

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MIL. SURGEON, WASHINGTON

Incidence of communicable disease and preventive medicine. Robert L. Callison. Mil. Surgeon, 108: 41–45, Jan. 1951.

This report on the health of military personnel in the American occupation zone of Germany shows that the aggregate venereal disease rate for the first quarter of 1950 was 55 per thousand, the lowest quarterly rate since VE-Day; the rate of 87 per thousand for 1949 represented a decline of 32 percent from the 1948 rate of 128.

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MISSISSIPPI DOCTOR, BOONEVILLE

Preventable disease control. July 1–November 30, 1950. A. L. Gray. Mississippi Doctor, 28: 337–339, Feb. 1951.

Venereal disease control is continuing to demonstrate the rapid decline in the total problem of syphilis. Percentage of positive and doubtful serologies found on surveys is declining. A study is now underway to determine rate of production of congenital syphilis and medical and public health deficiencies leading to occurrence of congenital syphilis in the newborn.

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NEW ENGLAND J. MED., BOSTON

Massachusetts premarital-examination law and inter-State marriages. Nicholas J. Fiumara. Massachusetts Department of Public Health. New England J. Med., 244: 194–196, Feb. 1, 1951.

As of December 1, 1950, Massachusetts has agreed to honor premarital examination certificates of 34 States, 2 Territories, and 1 Canadian Province. In return, 16 States, the Territory of Hawaii, and 1 Canadian Province have agreed to accept Massachusetts certificates when properly completed.

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NEW YORK STATE J. MED., NEW YORK

The present status of penicillin and streptomycin therapy in pediatrics. Herbert C. Soule. New York State J. Med., 51: 228–233, Jan. 15, 1951.

In this general discussion, in which a review of the literature is presented, the use of penicillin in treatment of diseases of infants and children, including congenital syphilis and gonorrhea, is considered.

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POSTGRAD. MED., MINNEAPOLIS

The clinical use of histamine. Bayard T. Horton. Postgrad. Med., 9: 1–10, 88–100, Jan. 1951.

After briefly discussing the pharmacologic action and clinical administration of histamine, the author described its use in the management of many seemingly unrelated clinical entities. One case report presented was that of a 62-year-old man with locomotor ataxia associated with lightning pains and morphinism. The patient had suffered agonizing pain for 32 consecutive years, during which time he had undergone intensive antisyphilitic therapy at frequent intervals. Histamine injections completely relieved the lancinating pains.

### POSTGRAD. MED., MINNEAPOLIS—CON.

Evaluation of antibiotic therapy. Chester S. Keefer. Postgrad. Med., 9 : 101–105, Feb. 1951.

The methods of administration of penicillin, streptomycin, aureomycin, Chloromycetin, and terramycin are discussed, and some of the general problems of selection of antibiotics in various infections are considered. The author also discusses synergism and antagonism and the use of antibiotics in prophylaxis.

### PROC. ROY. SOC. MED., LONDON

A form of tabes dorsalis due to acute degeneration of posterior root ganglia. Douglas McAlpine and Francis Page. Proc. Roy. Soc. Med., 43 : 947–948, Dec. 1950.

Case history of a 47-year-old male patient admitted to Middlesex Hospital with sensory loss of the feet, which gradually extended to involve the whole body with exception of a small band around the neck and abdomen, is presented and discussed. Some progressive improvement was noted upon treatment with penicillin followed by bismuth. Differential diagnosis of syphilitic polyneuritis, more usually seen in the secondary stage, complicating tabes dorsalis, was made.

### REV. GASTROENTEROL., NEW YORK

Infective hepatitis. B. O. C. Pribram and Roy Upham. Rev. Gastroenterol., 18 : 37–60, Jan. 1951.

Diagnosis and treatment of infective and homologous serum hepatitis are discussed. From a review of the literature, authors conclude that the general impression prevails that antisyphilitic treatments, not only with arsphenamines but also with mercury products, favor the development of epidemic jaundice.

Syphilis of the rectum. William Lieberman. Rev. Gastroenterol., 18 : 67–69. Jan. 1951.

Two cases in which the diagnosis of syphilis was made in conditions which masked themselves as common anorectal diseases are presented and discussed. One was a 16-year-old Negro male with syphilis simulating fissure-in-ano and the other a 46-year-old white male with syphilis simulating rectal cancer.

### S. CLIN. NORTH AMERICA, PHILADELPHIA

Diagnosis and treatment of diseases of the rectum. Orville C. King. S. Clin. North America, 30 : 1657–1671, Dec. 1950.

The necessity for adequate history and physical examination in cases of suspected rectal disease is brought to the attention of the physician, with emphasis on rectal examinations and the use of proctosigmoidoscopy. Treatment measures are described for strictures of the rectum due to gonorrhea, syphilis, and lymphogranuloma venereum.

### SOUTH. MED. & SURG., CHARLOTTE

The diagnosis and treatment of certain infections of the vulva and vagina : granuloma inguinale ; lymphopathia venereum ; monilia vulvovaginitis ; condylomata acuminata. Randolph H. Hoge. South. Med. & Surg., 112 : 389–391, Dec. 1950.

The author discusses briefly the diagnosis and advanced treatment of these infections. The first two are now rapidly cured with antibiotics ; the latter two are not benefited by these drugs, but other effective drugs have been found.

### THORAX, LONDON

Twenty-seven cases of syphilitic aneurysm of the thoracic aorta and its branches John Borrie and Selwyn G. Griffin. Thorax, 5 : 293–324, Dec. 1950.

A series of 24 patients with aortic aneurysm and 3 with innominate aneurysm is reviewed. Past methods of surgical treatment are surveyed. The Colt's method of wiring was used on nine patients, one of whom received deep X-ray therapy. Two patients with fusiform aneurysms involving the descending aorta were treated with cellophane wrapping.

### UROL. & CUTAN. REV., WEST PALM BEACH

Urine and prostatic fluid. A study of 5 normal males. G. Ashby Winstead. Urol & Cutan. Rev., 54 : 705–709, Dec. 195

### UROL. & CUTAN. REV., WEST PALM BEACH—CONTINUED

The author presents a report of urine and prostatic secretion studies made on 50 normal human males selected at random. Of 25 Negro males, 17 gave a past history of gonorrheal infection, while all 25 white males denied any history of gonorrhea. The percentage of positive cultures obtained from both the urine and the prostatic secretions was rather high. The history of gonorrhea in the Negro males may have accounted for the higher percentage of positive cultures obtained from them. Four patients showed *Trichomonas* in the spun urine.

### VIRGINIA M. MONTHLY, RICHMOND

The diagnosis and treatment of *Trichomonas vaginalis*. Robert Thrift Ferguson and Glenn S. Edgerton. Virginia M. Monthly, 77 : 643–645, Dec. 1950.

Of 600 women treated in a 10-year period, 95 percent were relieved of all symptoms immediately, and those who returned as directed remained symptom-free. Treatment consisted of swabbing the vagina with absorbent cotton and painting it with a 75-percent solution of mercurochrome.

### WHO NEWSLETT., GENEVA

W. H. O. and the advancement of science. Syphilis seminar at Paris. WHO Newslett., No. 11–12 : 2, Nov.–Dec. 1950.

At the Fournier Institute in Paris, a group of scientists from 11 European countries and the United States met for the International Symposium on Syphilis to discuss the value of penicillin in the treatment of syphilis. A similar seminar was organized in Helsinki, where Scandinavian scientists compared with American colleagues experiences in penicillin therapy.

Port au Prince. WHO's News. WHO Newslett., No. 1 : 4, Jan. 1951.

About 80,000 persons have already been treated for yaws or syphilis since the beginning of the large-scale control campaign organized with the help of WHO and UNICEF. Yaws is particularly widespread in Haiti.

### WISCONSIN M. J., MADISON

Present day treatment of gonorrhea. Paul C. Gatterdam. Wisconsin M. J., 49 : 1119–1120, Dec. 1950.

Treatment methods considered satisfactory and reliable for the general practitioner are discussed. Recommended treatment consists of 600,000 units of penicillin in a single dose or in two divided doses intramuscularly. Criteria for cure are disappearance of clinical signs and symptoms followed by three negative smears at weekly intervals in the male and cervical smears and cultures in the female.

Present day treatment of chancroid, lymphogranuloma venereum, and granuloma inguinale. Richard J. Rowe. Wisconsin M. J., 49 : 1120–1122, Dec. 1950.

A description of the three diseases is given, along with acceptable treatment methods for each. A chart is included showing signs and symptoms, laboratory aids, drugs, and dosages for each disease.

### YALE J. BIOL. & MED., NEW HAVEN

The morphology and staining characteristics of the *Treponema pallidum*. Review of the literature and description of a new technique for staining the organism in tissues. Robert E. Campbell and Paul D. Rosahn. Yale J. Biol. & Med., 22 : 527–543, July 1950.

An extensive review of the literature is presented. In an attempt to identify and photograph the various atypical forms of spirochetes found in syphilomas of the rabbit, a number of special technics for silver impregnation and reduction were restudied. From their experiments the authors adopted a procedure, described in detail, by which spirochetes and spirochetal forms appear blue black against a colorless background. Innumerable tissues have been processed by this technic. The authors discuss several variables which can be introduced without altering the end results.

## Summary of Reported Syphilis Mortality,[1] Each State, Each Region, and Continental United States, 1948

| Federal Security Agency Regions | Total syphilis deaths |  | Percent due to syphilis of total deaths from all causes | Syphilis deaths by detailed causes |  |  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  |  |  | Locomotor ataxia |  | Paresis |  | Aneurysm |  | Congenital syphilis |  | Other forms |  |
|  | Number | Rate[2] |  | Number | Rate[2] | Number | Rate[2] | Number | Rate[2] | Number | Rate[2] | Number | Rate[2] |
| Region 1—Total | 541 | 5.9 | 0.54 | 31 | 0.3 | 88 | 1.0 | 240 | 2.6 | 11 | 0.12 | 171 | 1.9 |
| Connecticut | 132 | 6.6 | .67 | 5 | .3 | 15 | .8 | 69 | 3.5 | 0 | 0 | 43 | 2.2 |
| Maine | 46 | 5.1 | .46 | 1 | .1 | 13 | 1.4 | 15 | 1.7 | 3 | .33 | 14 | 1.6 |
| Massachusetts | 258 | 5.6 | .49 | 15 | .3 | 44 | .9 | 120 | 2.6 | 4 | .09 | 75 | 1.6 |
| New Hampshire | 47 | 9.0 | .76 | 4 | .8 | 6 | 1.1 | 16 | 3.1 | 3 | .57 | 18 | 3.4 |
| Rhode Island | 45 | 6.0 | .55 | 5 | .7 | 9 | 1.2 | 12 | 1.6 | 0 | 0 | 19 | 2.6 |
| Vermont | 13 | 3.6 | .32 | 1 | .3 | 1 | .3 | 8 | 2.2 | 1 | .31 | 2 | .6 |
| Region 2—Total | 2,332 | 7.8 | .73 | 81 | .3 | 679 | 2.3 | 655 | 2.2 | 60 | .2 | 857 | 2.9 |
| Delaware | 31 | 10.3 | .91 | 0 | 0 | 8 | 2.7 | 10 | 3.3 | 3 | 1.0 | 10 | 3.3 |
| New Jersey | 341 | 7.2 | .71 | 8 | .2 | 88 | 1.8 | 127 | 2.7 | 7 | .1 | 111 | 2.3 |
| New York | 1,189 | 8.4 | .75 | 40 | .3 | 352 | 2.5 | 363 | 2.6 | 15 | .11 | 419 | 2.9 |
| Pennsylvania | 771 | 7.4 | .71 | 33 | .3 | 231 | 2.2 | 155 | 1.5 | 35 | .33 | 317 | 3. |
| Region 3—Total[3] | 1,031 | 8.8 | .96 | 30 | .3 | 249 | 2.1 | 300 | 2.5 | 73 | .62 | 379 | 3.2 |
| District of Columbia | 115 | 13.3 | 1.40 | 7 | .8 | 18 | 2.1 | 46 | 5.3 | 0 | 0 | 44 | 5.1 |
| Maryland | 275 | 12.8 | 1.23 | 8 | .4 | 64 | 3.0 | 102 | 4.7 | 13 | .60 | 88 | 4.1 |
| North Carolina | 194 | 5.1 | .64 | 3 | .1 | 35 | .9 | 51 | 1.3 | 22 | .58 | 83 | 2. |
| Virginia | 282 | 9.2 | .97 | 8 | .3 | 86 | 2.8 | 66 | 2.2 | 28 | .92 | 94 | 3.1 |
| West Virginia | 165 | 8.6 | .94 | 4 | .2 | 46 | 2.4 | 35 | 1.8 | 10 | .52 | 70 | 3.7 |
| Region 4—Total | 1,490 | 8.8 | .90 | 58 | 3 | 388 | 2.3 | 513 | 3.0 | 56 | .33 | 475 | 2. |
| Kentucky | 192 | 6.7 | .68 | 5 | .2 | 66 | 2.3 | 42 | 1.5 | 15 | .53 | 64 | 2. |
| Michigan | 502 | 8.1 | .88 | 18 | .3 | 102 | 1.6 | 237 | 3.8 | 14 | .23 | 131 | 2.1 |
| Ohio | 796 | 10.2 | .98 | 35 | .4 | 220 | 2.8 | 234 | 3.0 | 27 | .34 | 280 | 3. |
| Region 5—Total | 1,215 | 6.6 | .64 | 46 | .2 | 375 | 2.0 | 376 | 2.0 | 17 | .09 | 401 | 2. |
| Illinois | 622 | 7.4 | .68 | 17 | .2 | 215 | 2.6 | 193 | 2.3 | 6 | .07 | 191 | 2. |
| Indiana | 312 | 8.0 | .79 | 13 | .3 | 104 | 2.7 | 83 | 2.1 | 9 | .23 | 103 | 2. |
| Minnesota | 135 | 4.6 | .49 | 6 | .2 | 25 | .9 | 56 | 1.9 | 0 | 0 | 48 | 1. |
| Wisconsin | 146 | 4.4 | .45 | 10 | .3 | 31 | .9 | 44 | 1.3 | 2 | .06 | 59 | 1. |
| Region 6—Total | 1,500 | 9.5 | 1.01 | 25 | .2 | 364 | 2.3 | 387 | 2.5 | 113 | .72 | 611 | 3. |
| Alabama | 287 | 9.9 | 1.08 | 6 | .2 | 37 | 1.3 | 60 | 2.1 | 26 | .90 | 158 | 5. |
| Florida | 273 | 11.2 | 1.10 | 2 | .1 | 52 | 2.1 | 110 | 4.5 | 10 | .41 | 99 | 4.1 |
| Georgia | 281 | 8.9 | .95 | 4 | .1 | 93 | 2.9 | 66 | 2.1 | 17 | .54 | 101 | 3. |
| Mississippi | 209 | 9.9 | 1.03 | 4 | .2 | 38 | 1.8 | 41 | 1.9 | 22 | 1.04 | 104 | 4. |
| South Carolina | 230 | 11.6 | 1.28 | 2 | .1 | 74 | 3.7 | 52 | 2.6 | 25 | 1.3 | 77 | 3. |
| Tennessee | 220 | 6.9 | .76 | 7 | .2 | 70 | 2.2 | 58 | 1.8 | 13 | .41 | 72 | 2. |
| Region 7—Total | 744 | 6.8 | .67 | 31 | .3 | 178 | 1.6 | 251 | 2.3 | 22 | .20 | 262 | 2. |
| Iowa | 143 | 5.5 | .55 | 11 | .4 | 28 | 1.1 | 54 | 2.1 | 4 | .15 | 46 | 1. |
| Kansas | 118 | 6.2 | .64 | 5 | .3 | 35 | 1.8 | 36 | 1.9 | 2 | .11 | 40 | 2. |
| Missouri | 365 | 9.4 | .85 | 10 | .3 | 79 | 2.0 | 116 | 3.0 | 12 | .31 | 148 | 3. |
| Nebraska | 68 | 5.3 | .54 | 4 | .3 | 21 | 1.6 | 25 | 1.9 | 2 | .16 | 16 | 1. |
| North Dakota | 17 | 2.9 | .33 | 0 | 0 | 1 | .2 | 10 | 1.7 | 0 | 0 | 6 | 1. |
| South Dakota | 33 | 5.4 | .57 | 1 | .2 | 14 | 2.3 | 10 | 1.6 | 2 | .33 | 6 | 1. |
| Region 8—Total | 1,368 | 9.3 | 1.07 | 21 | .1 | 353 | 2.4 | 343 | 2.3 | 110 | .74 | 541 | 3. |
| Arkansas | 148 | 7.6 | .97 | 1 | .1 | 40 | 2.1 | 35 | 1.8 | 6 | .31 | 66 | 3. |
| Louisiana | 403 | 15.6 | 1.71 | 5 | .2 | 96 | 3.7 | 86 | 3.3 | 40 | 1.54 | 176 | 6. |
| New Mexico | 63 | 11.0 | 1.12 | 0 | 0 | 5 | .9 | 20 | 3.5 | 11 | 1.93 | 27 | 4. |
| Oklahoma | 165 | 7.2 | .86 | 4 | .2 | 45 | 2.0 | 47 | 2.0 | 9 | .39 | 60 | 2. |
| Texas | 589 | 8.0 | .92 | 11 | .1 | 167 | 2.3 | 155 | 2.1 | 44 | .59 | 212 | 2. |
| Region 9—Total | 215 | 6.6 | .70 | 6 | .2 | 34 | 1.0 | 109 | 3.4 | 7 | .22 | 59 | 1. |
| Colorado | 105 | 8.8 | .83 | 4 | .3 | 12 | 1.0 | 63 | 5.3 | 2 | .16 | 24 | 2. |
| Idaho | 19 | 3.2 | .39 | 1 | .2 | 5 | .9 | 7 | 1.2 | 0 | 0 | 6 | 1. |
| Montana | 39 | 7.6 | .66 | 1 | .2 | 2 | .4 | 17 | 3.3 | 5 | .98 | 14 | 2. |
| Utah | 30 | 4.5 | .59 | 0 | 0 | 8 | 1.2 | 15 | 2.2 | 0 | 0 | 7 | 1. |
| Wyoming | 22 | 7.7 | .92 | 0 | 0 | 7 | 2.5 | 7 | 2.5 | 0 | 0 | 8 | 2. |

See footnotes at end of table.

## ummary of Reported Syphilis Mortality,[1] Each State, Each Region, and Continental United States, 1948—Cont.

| Federal Security Agency Regions | Total syphilis deaths | | Percent due to syphilis of total deaths from all causes | Syphilis deaths by detailed causes | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Locomotor ataxia | | Paresis | | Aneurysm | | Congenital syphilis | | Other forms | |
| | Number | Rate[2] | | Number | Rate[2] | Number | Rate[2] | Number | Rate[2] | Number | Rate[2] | Number | Rate[2] |
| egion 10—Total[3] | 1,180 | 7.7 | .82 | 45 | .3 | 205 | 1.3 | 465 | 3.0 | 36 | .23 | 428 | 2.8 |
| Arizona | 63 | 8.9 | .96 | 1 | .1 | 8 | 1.1 | 20 | 2.8 | 9 | 1.28 | 25 | 3.6 |
| California | 870 | 8.4 | .88 | 36 | .3 | 144 | 1.4 | 350 | 3.4 | 24 | .23 | 316 | 3.1 |
| Nevada | 15 | 9.1 | .92 | 1 | .6 | 6 | 3.7 | 3 | 1.8 | 1 | .62 | 4 | 2.4 |
| Oregon | 100 | 6.1 | .71 | 5 | .3 | 25 | 1.5 | 44 | 2.7 | 1 | .06 | 25 | 1.5 |
| Washington | 132 | 5.4 | .59 | 3 | .1 | 22 | .9 | 48 | 1.9 | 1 | .04 | 58 | 2.4 |
| Total continental United States | 11,616 | 8.0 | .80 | 375 | .3 | 2,913 | 2.0 | 3,639 | 2.5 | 505 | .33 | 4,184 | 2.9 |

[1] 1948—by place of residence.
[2] Rates per 100,000 population.
[3] Continental United States only.

Source: Bureau of the Census, Population Releases; National Office of Vital Statistics, Vital Statistics in the United States, 1948.

FSA–PHS Division of Venereal Disease, Office of Statistics, 3–16–51 (MRB:AS/mb).

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# *The* JOURNAL *of* VENEREAL DISEASE INFORMATION

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## Case-Finding Issue

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FEDERAL SECURITY AGENCY
Public Health Service

## Submission of Manuscripts

In order to facilitate the handling of manuscripts submitted for publication in The Journal of Venereal Disease Information, the editor requests that copy be prepared in triplicate, typewritten, double-spaced, with liberal margins. Statistical tables and charts should be set up according to the style used in the Journal, and should be presented on separate sheets, rather than within text material.

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# Editorial

Since the development of acceptable technics of diagnosis and treatment of syphilis, case finding has persisted as the most difficult problem of venereal disease control.

Much has been accomplished in developing methods of locating infected persons and in bringing them to treatment, but seeking out infected individuals one by one is impossible if you do not know who they are. It is therefore understandable why so much effort has been directed to developing public educational methods of getting infected persons to recognize the possibility of their infection and to seek diagnosis and treatment.

Considerable educational and informational material designed to motivate infected individuals to seek diagnosis and treatment has been developed and presented to the public through many mediums of mass communication. However, we are acutely aware of the many problems that have developed in presenting venereal disease information through these mediums of mass communication and trying to reach those segments of the population that need it most.

Decisions on what public educational programs and types of material are most effective in reaching the infected persons and in motivating them to obtain treatment would be simple, if we could deal with each individual personally as we do during diagnosis, treatment, or contact interviewing when we tailor our technics to the individual's personality, condition, and ability to understand.

Case finding through mass communication mediums unfortunately requires dealing with a group of people that are not readily identifiable as to levels of education, economic status, or patterns of behavior. It is necessary, therefore, to study known venereal disease patients to develop data about them which can be used to establish a composite picture of the group of people we are trying to serve.

This issue contains a discussion of the problem and some of the results of approaches that have been made to meet it and though they are concerned with venereal disease case finding, they would probably be applicable to many other phases of public health.

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# Case Finding Through an Understanding of Known Syphilitic Patients

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Men and women with symptoms of infectious syphilis sometimes seek advice from friends and relatives about these symptoms. It is important to know what kind of people provide them with counsel. Do some informants give them better advice than others—for example, are they more apt to receive correct information about their symptoms from a parent or a spouse? Data from a recent study of 500 Mississippi Negroes with infectious syphilis provide some concrete answers to these and similar questions. There is strong evidence from this study to suggest that people secure the bulk of their information about the venereal diseases from conversations with others. Sometimes the counsel which they receive is good, and, as a result, they seek competent medical diagnosis. Often, however, they receive incorrect information which causes them to delay diagnosis or to put it off altogether. These latter cases frequently are kept from diagnosis by unfavorable accounts of the routine involved in the diagnosis and treatment of syphilis. Whether we approve of these unorganized networks of informal communication or whether we feel they may do great harm to a venereal disease control program, we must reckon with the fact that they do exist and they do exert considerable force in determining how a person reacts to his venereal disease infection. Thus, an analysis of our research data showed that the kind of venereal disease information which an infected individual received from others played an important role in determining whether he volunteered for diagnosis of his symptoms, or whether he had to be found through the operation of routine case-finding methods.

Respondents interviewed for this study were asked whom they consulted for advice about their venereal disease symptoms. They were further questioned as to the nature of the advice which they received. In analyzing the answers to these questions, we learned that persons infected with syphilis tended to talk about their health problems with certain friends and relatives while ignoring others with whom they had daily association. Persons with venereal disease symptoms most frequently consulted the Negro mother. This held true for both men and women, for the young and the old, and for the married and the single persons in this study. The role of the Negro mother in molding the attitudes of members of the Negro community toward the venereal diseases was tremendous. We must enlist her aid in our grass roots campaign to spread correct information and to mold favorable attitudes, for she can, by her influence, persuade many otherwise reluctant persons to volunteer for diagnosis of venereal disease symptoms. The opportunity of enlisting the active support of the Negro mothers is presented to public health workers when they meet these mothers in prenatal and postnatal clinics.

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NOTE: This paper summarizes certain sections of a longer report, "Case Finding and Patient Management Through an Understanding of Known Syphilitic Patients," which is available, upon request, from the Division of Venereal Disease, U. S. Public Health Service, Washington 25, D. C. Contained in this report are the supporting statistical evidence, pertinent charts, and other data relating to the findings discussed in this paper. In addition, the full report presents a description of the sample, a review of technics employed in collecting these data, and a discussion of the methods of analysis used.

On the other hand, our data indicated that both men and women received the poorest advice about their venereal disease symptoms from their own spouses. Several reasons can be offered to explain this condition. It may be that marriage resulted in the exposure of both husband and wife to the same kind of misinformation about the venereal diseases. Or, and this seems to be a more likely hypothesis, a man frequently may be hesitant to suggest to his marital partner that she has contracted a venereal disease—less willing, perhaps, because he does not want to embarrass her, or because he may feel that suspicion for causing the infection will fall upon him. Under such circumstances, he may feel it is a safer policy to assure his mate that her symptom is simply "the chaff" or "a rising" which does not require medical attention.

The foregoing explanations give some hints as to how nonmedical and nonsymptomatic factors may influence an individual's decision to volunteer or not volunteer for the diagnosis of a syphilitic infection. Other nonmedical factors also were found to be significantly related to the prediagnostic behavior of men and women with early syphilis. But more valuable than any specific research findings was the understanding which this study gave us of the basic personalities of volunteers and nonvolunteers. Although specific data are useful in mapping an educational program for a particular group in our venereal disease population, their value will disappear in time. New problems will appear and new educational technics will be developed to replace those in current use. However, an understanding of how people approach their daily problems, whether these problems are medical or nonmedical, gives us insight into their personalities and this insight has a lasting value. Armed with this kind of understanding, we can meet more intelligently the existing problems as well as new problems which may develop in the course of administering adequate medical care to persons infected with a venereal disease. A study of nonvolunteering calls for long and serious work. In areas with a high prevalence of venereal disease, the nonvolunteer constitutes a major problem to a venereal disease control program.

There are several reasons why it is desirable for persons with symptoms of infectious syphilis to volunteer for diagnosis. Routine case-finding programs cost money. Moreover, cases of infectious syphilis constitute a threat to the health of the community until they are discovered and brought to control. This study, conducted among patients in the treatment centers of Mississippi, was designed to learn more about the reasons why some people delay or avoid altogether the diagnosis of symptoms of early syphilis. During the course of this investigation, data were collected from 500 men and women with primary and secondary syphilis. Information was secured from them on a host of topics, including the nature and duration of their venereal disease symptoms, their knowledge about syphilis, their family and community interests, and their emotional and vocational orientations. Lengthy interviews were conducted with each respondent to obtain these data.

After thorough analysis of these data, we concluded that volunteering and nonvolunteering could not be explained by one or two "obvious facts." Thus, we could not say that all people who volunteered did so simply because they happened to notice venereal disease symptoms on their bodies. A majority of the nonvolunteers noticed a symptom but did not seek diagnosis. We could not say that the types of symptoms were decisive in determining whether a person would be a volunteer or a nonvolunteer. Our data did not support such a thesis. We could not say that all volunteering resulted from a person's suspecting that his symptoms might indicate the presence of a venereal disease. Many thought they might have been infected with a venereal disease but still failed to seek diagnosis. They did not realize the seriousness of their infection. Nor could nonvolunteering be explained by the operation of chance by the fact, for example, that some infected individuals were found by a contact investigator while others were not. Important as all these factors might be in determining who could become the volunteers of our syphilitic population, we could not presume to explain volunteering or nonvolunteering by reference to these factors alone. The reasons why people volunteered or did not volunteer went far deeper than any of the foregoing conventional explanations.

The outstanding characteristic of nonvolunteers was apathy toward their infection. This could be a meaningless statement unless we support it with concrete evidence. We have that evidence. Nonvolunteers are both geographically and psychologically isolated people. They do not read as much, they do not listen to the radio as much, they do not use the telephone as much, and they do not attend the movies as much as the volunteers. They have, moreover, less schooling than the volunteers and are more likely to come from a poor economic stratum of the population. They are less inclined to look after their own welfare; they look instead to others to provide answers to their daily problems. They are more often the followers, and not the leaders in their home communities. Their interests and social life are extremely limited. Unfortunately, they are prone to self-deception in regard to their venereal disease infection and will occasionally adopt an "it can't happen to us" attitude. Coupled with this prevailing disinterest in their health is a fatalistic attitude toward all diseases. They tend to regard bad health as a visitation of fate over which they have little control.

Apparently, some nonvolunteers stayed away from diagnosis because of a resentment which they felt against the whole administrative procedure involved in finding, treating, and stopping the spread of venereal disease. For such people, the process of securing diagnosis and treatment involved personal inconvenience and embarrassment. Often they gave the impression that the health department, rather than they themselves, stood to benefit from their taking treatment for a venereal disease. In fact, the general health practices of all these people need to be improved. Far too many patients had tried self-medication when they saw symptoms. Many even insisted that self-medication had cured them of their infection. As a rule, they did not distinguish in their minds between the diagnostic and treatment aspects of their syphilitic infection. If they were afraid of some aspect of the treatment process, that fear was as effective in keeping them from diagnosis as a fear of the diagnostic process itself. The mental picture which people entertained of the diagnostic and treatment aspects of syphilis control affected their willingness to seek professional care when they acquired a venereal disease infection.

Local health department clinics in this part of the country have succeeded, however, in winning the confidence of most of the people. Two-thirds of all persons in these areas found to have infectious syphilis had volunteered for diagnosis. Most of the patients reported favorably on the medical care they received in these clinics. But there were some patients (especially women) who approached the treatment process with a sullen or resentful attitude and proved uncooperative during all phases of the treatment process. For example, they revealed the names of a significantly fewer number of contacts than did other patients. There seems much to recommend the practice of "prepping" patients concerning the treatment of venereal disease. By explaining to them how long the treatment lasts and by answering questions about the process itself, we will get better cooperation from patients and will, in addition, secure the names of a higher number of contacts from them during the contact interview. We can combat misinformation about the treatment of venereal disease by employing certain cooperative patients as "missionaries." Plans are under way in Mississippi to give specia instruction and attention to selected pa tients during the course of their treatment so that they will carry back to their home communities information and attitudes that will influence other infected persons to seek diagnosis and treatment.

In the Mississippi study, as in other comparable studies, the ratio of volunteers to nonvolunteers was about two to one. Workers in the field of venereal disease control should not take undue satisfaction, however, in knowing that two-thirds of their patients volunteered for diagnosis. Far too many of these volunteers waited a long time after noticing a venereal disease symptom before seeking medical diagnosis; the average volunteer in this group waited 16 days. The average nonvolunteer was not found until 3 weeks after the first venereal disease symptom appeared. Recently a system has been developed in one area of Mississippi which enables us to bring to diagnosis all contacts of patients with early syphilis in one-half or less of the time formerly required. Already the effects of this program have been reflected in a reduction in the number of new cases of primary and secondary syphilis found in these areas. If this program continues to produce encouraging results, it will be extended to all areas of the State.

Almost half of all the volunteers interviewed for this study had waited until after the appearance of a second symptom of venereal disease before seeking diagnostic help. Such evidence constitutes a challenge to health educators to find ways of convincing people who are prone to volunteer that they should not delay. The factor which appeared most closely related to fast or slow volunteering was the degree of personal concern which an individual felt about his venereal disease symptoms. Volunteers who worried about their symptoms took quick diagnostic action; those who adopted a placid attitude often waited two or more weeks before consulting a doctor or a public clinic for aid.

There is some evidence to suggest that one subsection of the venereal disease population requires special study and attention from venereal disease control workers. These are the so-called "repeaters." Although patients who had had previous treatment for a venereal disease were better informed about these diseases and better able to make a correct self-diagnosis of their symptoms than other patients, they did not volunteer for diagnosis in any greater proportion than did persons with no previous venereal disease infection. Despite their previous experience and education, they allowed themselves to become reinfected. Knowing that treatment was relatively swift and effective, many of them seem to have behaved as if syphilis were "no worse than a bad cold." Previous treatment for a venereal disease did not prevent 26 percent of all our respondents from becoming infected again. Do such cases represent a failure on the part of our educational programs? Perhaps. But it seems likely also that some of these people might never have responded to run-of-the-mill educational appeals. Other research workers have suggested, and our findings tend to confirm, that many venereal disease repeaters need help on solving personal, family, and job problems. There are reasons for believing that these people may seek escape from such problems by indulging in promiscuous sexual relations. Because the prevalence of venereal disease seems to be particularly high in their communities, sexual promiscuity on their part means that they run an especially grave risk of becoming reinfected with one of these diseases.

It was encouraging to note that most persons in the syphilitic population possessed some correct information about the cause, the symptoms, and the possible outcome of syphilis. Mixed in with this correct information, however, was much wrong information. The incorrect ideas diminished the effectiveness of the correct knowledge, confusing people and causing them to hesitate about seeking medical aid when they needed it. In general, educational themes which caused respondents to take a serious view of their infections were most successful in bringing them to diagnosis. Unquestionably, the degree of anxiety which people had about their syphilitic infection played a significant part in determining whether they volunteered for diagnosis or whether they did not. Those who were concerned about their infection volunteered for medical attention. Those who were casual about it often did not volunteer. The lesson to be drawn from these facts is that the public must be convinced that when syphilis is allowed to go undetected and untreated, physical damage may result from the infection. But while impressing people with this fact, we must assure them also that adequate treatment of syphilis in its early stages will prevent the serious developments of late syphilis.

We found that male and female nonvolunteers differed sharply in their knowledge of syphilis. Male volunteers and nonvolunteers could not be distinguished on the basis of their knowledge of the subject. But the reverse was true for women. Women with much knowledge of all aspects of venereal disease volunteered in great force. Those with little knowledge of syphilis were most often nonvolunteers. This finding has importance for our syphilis control program because our data indicated also that women, in general, knew less about venereal disease than did men. Since the possession of more factual information about venereal disease is associated with a greater percentage of volunteers among females, we might well give high priority in any venereal disease educational program to material designed to appeal especially to the women in our audience. We could direct this material to the younger women who most often have infectious syphilis and also to the older women who exert such powerful influence on public opinion in the Negro community.

## Education and Information

In spreading our message about venereal disease, we rely in great measure on the mediums of communication which have won the confidence of commercial advertisers and have been employed in innumerable public appeals and educational programs. In analyzing these mediums of communication, not to appraise their intrinsic value generally as tools in public health education, but to establish their effectiveness in the specific field of venereal disease education, we found that they were of some, but not great, value. Until more effective means of communication are available, however, we probably shall continue to employ those now in use.

There was little indication that the radio and press, for example, raised the level of venereal disease information among the patients in this study. Publicity through these channels, moreover, did not affect appreciably the willingness of infected persons to volunteer for diagnosis. By way of general comment, we might remark that radio messages reached more people than any other channel of information employed by us, and probably offered the best means of reaching the most people in the areas where our study was made. Radio has the great advantage of being able to bridge geographic and educational barriers, but much work remains to be done in adapting radio venereal disease programs to the likes and interests of the nonvolunteer. It is a difficult job to win and retain the attention of the nonvolunteer with conventional radio health programs. We found evidence that radio health programs tend to attract a disproportionate number of worriers—persons who are already concerned about the state of their health.

Any form of printed message is of doubtful value in spreading venereal disease information among the southern rural Negroes. The one place where printed material could be used to good advantage would be in the higher grades of our public schools. A well-designed message which would not offend parents or church groups could help mold desirable attitudes toward sex and toward the venereal diseases among students during a very impressionable stage of their lives. In turn, these students would carry their information and attitudes back to their homes and families. On the other hand, the illustrated type health book, especially in the comic book motif, seems to have been successful in winning an audience among many of these Negroes.

Formal presentation of information about the venereal diseases, of the sort which was given to the armed forces during World War II, had a long-term effect in raising the level of knowledge which men in this sample had about these diseases. Unfortunately, an important element appeared to be lacking in some of these programs of formal venereal disease education. Although the ex-servicemen had absorbed the factual material presented to them in these programs, they did not give evidence of any greater tendency to avoid future venereal disease infection, nor did they show any greater disposition to volunteer for diagnosis after acquiring a venereal disease than did persons who had not had the advantage of formal venereal disease education. An important ingredient was somehow missing from the training which many of them received. It is slight consolation to the public health worker to know that a patient is well-informed about the venereal diseases if that information does not serve to deter the patient from exposing himself to future infection, or if it does not more readily motivate the patient to seek diagnosis voluntarily after he has acquired a venereal disease infection.

Although this study dealt with a "social disease," we did not find that fear of the social consequence of having syphilis played a decisive role in determining the volunteer status of respondents in this study. This does not mean to imply that persons in this study did not entertain fears and misgivings over having a venereal disease. For them, as for many other persons in our society, these diseases still carry a stigma of shame. People still worry lest friends or relatives learn about their infection. But our data indicated that concern over the social stigma of having a venereal disease did not distinguish volunteers from nonvolunteers. Both groups shared these social fears in about equal proportion and with about equal intensity. What we found, instead, was that other factors apparently played a more important part in determining a patient's volunteer status. We learned that concern over the damage and discomfort which these diseases may cause, the level of information which respondents have about these diseases, and the prior experiences of respondents in solving their own personal problems, all played significant roles in determining which persons volunteered for diagnosis of their infections and which of them did not.

Yet, nothing in the foregoing discussion of nonvolunteer behavior should be construed as meaning that our venereal disease educational activities should concentrate chiefly on the nonvolunteer. Vigorous efforts must be made to persuade persons who are already inclined to volunteer as a result of our educational efforts to continue to seek of their own accord diagnosis of venereal disease symptoms.

### Summary

This paper summarizes the results of an intensive study of 500 Negroes with infectious syphilis living in an area with a high prevalence of venereal disease. It reports on the reasons why some of them volunteered for diagnosis of their infections and why others did not. It indicates how volunteers and nonvolunteers differed and suggests ways in which more nonvolunteers may be persuaded to seek medical diagnosis.

# Syphilis Case Finding Through Education[1]

**John W. Morse, M. A.,[2] and Albert P. Iskrant, M. A.[3]**

### Research Objectives and Principal Findings of an Exploratory Study

Case finding has assumed a role of major importance in the field of venereal disease control. The currently accepted case-finding methods are: (1) mass or screen testing, including testing required by law; (2) contact investigation; and (3) education as a method for getting infected persons to seek diagnosis of their own accord. Studies have been conducted of these three methods in an effort to determine their level of accomplishment and how they might be improved. Most of the previous studies of education were set up to evaluate particular programs rather than to search for the underlying basic principles upon which a sound educational program can be built.

There has not been a lack of interest, however, in the study of the behavior of infected individuals. In studying the part played by the various case-finding methods, Pariser (*2*) in 1945 reported on the reasons persons gave for coming to diagnosis. Using 1944 data, Iskrant (*3*), in reporting on the reasons for coming to diagnosis, highlighted the part played by contact investigation in case finding. On the basis of these early studies it was found desirable to set up some practical scheme for securing data on reasons for coming to diagnosis from a larger number of areas. In 1946, when the reporting requirements of the Division of Venereal Disease were changed, provision was made for areas wishing such information to record reason for coming to diagnosis on the "diagnostic and new case" card. This information, now available for 17 areas, has been tabulated and certain of the more recent data are presented on page 175 of this issue of THE JOURNAL OF VENEREAL DISEASE INFORMATION.

The aims of this paper are: (*a*) to attempt to describe some of the problems of the study of venereal disease education; (*b*) to outline a broad program of research into these problems; and (*c*) to present briefly the results of a preliminary study following this research plan.

### *Some Problems in the Study of Venereal Disease Education*

Many cases of infection with a particular disease undoubtedly can be found through the use of the printed word, radio, movies, and other forms of communication. (Consideration is not given here to public relations activities which may be necessary as background for the conduct of a control program.) The design and specifications of a case-finding program relying on communication, as contrasted with legal (one aspect of the screen-testing method) and direct epidemiologic methods, will vary according to the basic objective to be achieved. These objectives should perhaps be contrasted to distinguish clearly between the use of communication telling of symptoms and other facts about the disease to persuade infected persons to seek diagnosis of their own accord, and the use of communication to induce all persons in a high-prevalence area or population group to report for diagnosis. Infected persons might be found by means of one or both of the following two types of case-finding program:

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*Type A.*—This is a long-range type of program which may be conducted by communicating to the public (or segments thereof suspected of a high prevalence of any one disease) specific facts about the disease, including information about symptoms and the availability of diagnostic service, so that any person likely to be infected or who may become infected later will seek diagnosis of his own accord. *This is believed to be an education process and is the subject of this paper.*

*Type B.*—This is a type of case-finding program, which may be conducted by means of mass appeal, to induce all persons in a given area (usually an area of high prevalence) to report for examination. A slight variation of this is the direction of an appeal to all persons in an area suspected of having not necessarily a high prevalence of any one disease, but suspected of containing a fairly large percentage of persons who might require medical attention for any of several conditions, to have a general physical examination. Such mass testing for various diseases, subject to routine examinations, is currently known as multiple screening.

The kinds of public appeal used to persuade people to report for diagnosis of one disease or for multiple screening are probably very much alike. There may be no basic conflict for these two B-type programs. It is believed, however, that the B-type programs may interfere seriously with the conduct of the A-type program. This is, of course, not the subject of this paper, but to the extent that some of the study results (later presented) bear on this subject, as related to the syphilis case-finding program, the following questions are raised:

When a mass testing (B-type) program is conducted to induce *all* persons in a given group to report for examination to "know for sure," how should the publicity of such a program be modified, without jeopardizing the program, to take care of individuals who will be found not to be infected at the time of the come-one-come-all campaign but who subsequently notice symptoms? In the conduct of mass testing or routine testing programs of the B-type, the problem is that of determining how best to induce all persons to report for an examination, thus finding early and late syphilis among the high-prevalence group, and, either at the same time of this appeal or subsequently, to educate the people so those who later notice symptoms will suspect infection and go for examination.

There may be other conflicts between education and the mass-appeal approach (type A versus type B). Pictures showing a prominent person in the community having a blood test hardly add to a sustaining type of educational program which tells how syphilis is acquired, describes the symptoms, etc., though they may help remove stigma and demonstrate that such testing is not an ordeal. The danger lies in using effective mass psychology methods at one time which may "boomerang" later when educational methods are employed.

Having distinguished between the two general types of program and having pointed out possible conflict between them, the remainder of this paper will deal solely with the use of communication in educating persons so that, when necessary, they will seek diagnosis of their own accord.

It is believed that there will be slow progress in the development of educational methods as long as only the mass over-all response to a given educational program is observed, for by design such studies will answer but one general question: Was the one particular case-finding type of approach effective? Or, under a system of statistical controls, which one of the several types of approach seems best? One particular approach may be judged correctly as effective and therefore accepted in its entirety at another time. However, there may have been something about the what, how, where, and to whom decisions made by the health educator in planning the program which was incorrect but not made known by the over-all evaluation. For example, the program may have an adverse effect, in the long run, on a control program by unwittingly including certain facts that might lead people to current concern, but to future complacency or promiscuity.

It is believed that a study of the actions of individuals, rather than an over-all study of the action of a mass of people, yields more basic answers which help to determine the reasons for the success or failure of an educational program. Studies are needed whereby all pertinent factors for each individual are measured and so interrelated and studied as to permit the deduction of over-all characteristics and behavior patterns. Some of the problems that can be clarified only through analyzing the characteristics and reactions of individual patients are: Who are the venereal disease patients; what is their knowledge of and what are their attitudes toward venereal disease and health facilities; what do these patients read, see, and hear; to whom do they talk; why do some voluntarily seek diagnosis while others do not? Such analyses, using the individual approach, are in contrast to the study of mass reaction, or the over-all accomplishments of particular programs.

### *Outline of a Broad Program of Research*

Figure 1 illustrates schematically the areas of investigation believed to be essential for determining a program of education which will induce persons with early symptomatic syphilis to seek diagnosis quickly. (This is one phase of the case-finding program.) The basic assumption is that a research program which is based upon the study of patients known to have primary or secondary syphilis will provide the necessary information on which future educational programs can be based effectively. It is believed that the findings regarding the "known" group can be projected to our understanding of the "undiscovered." Among the known cases, there is, fortunately for research, a group of non-volunteers. (A person is considered to

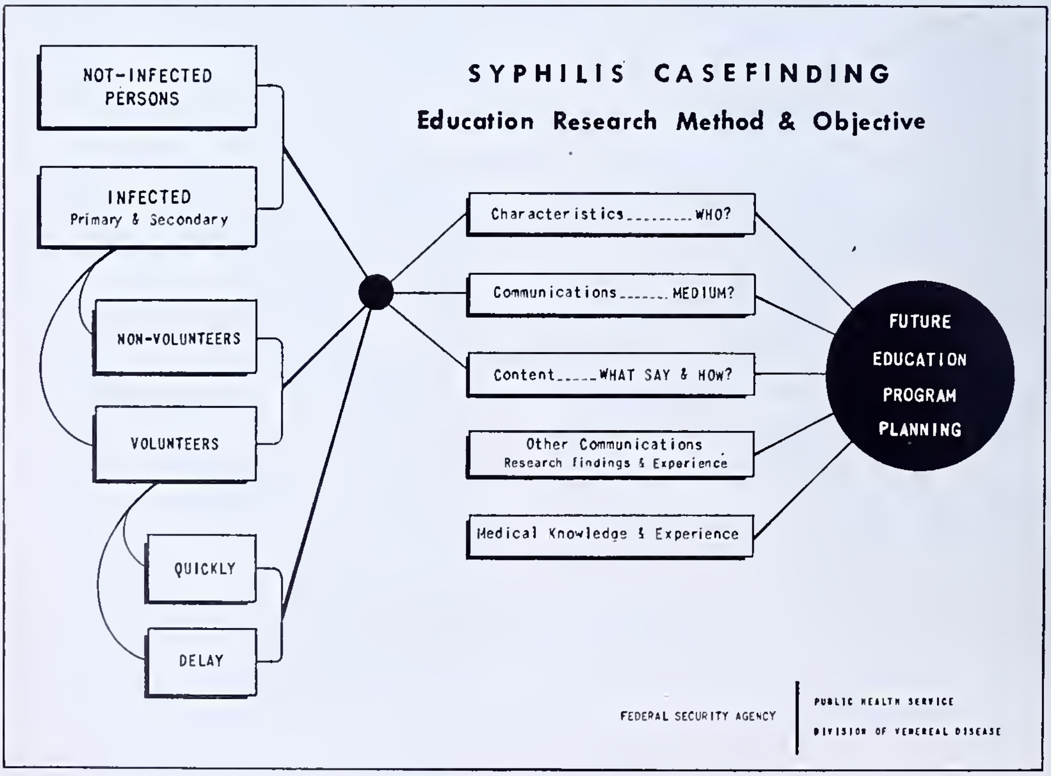
SYPHILIS CASEFINDING
Education Research Method & Objective
NOT-INFECTED PERSONS
INFECTED Primary & Secondary
NON-VOLUNTEERS
VOLUNTEERS
QUICKLY
DELAY
Characteristics.........WHO?
Communications......MEDIUM?
Content.....WHAT SAY & HOW?
Other Communications Research Findings & Experience
Medical Knowledge & Experience
FUTURE EDUCATION PROGRAM PLANNING
FEDERAL SECURITY AGENCY
PUBLIC HEALTH SERVICE
DIVISION OF VENEREAL DISEASE

Figure 1.

be a nonvolunteer if he was examined as a result of contact investigation or because of premarital, prenatal, or preemployment laws. A volunteer is a person reporting to diagnosis of his own accord, on his own initiative.) To the extent that we have broken into chains of infection, we have, in a sense, a sample of the "undiscovered." Fortunately, too, we have a valuable measuring scale for the volunteer group, that is, the length of delay in volunteering for diagnosis after noticing symptoms.

Research conducted in the field of public health is, in some ways, comparable to the research of the advertising and marketing organizations. There are, however, advantages in public health research. Available for interview is a group of people, the nonvolunteers, who, in effect, are forced to buy a product. And, for those who buy the product voluntarily, there is their valuation of its worth, that is, the length of delay before seeking diagnosis after noticing symptoms.

The objective of this outlined research program is the formulation of a clear, practical set of principles for future use in devising venereal disease educational materials intended to induce persons who have primary or secondary syphilis to seek diagnosis and treatment quickly and voluntarily. These principles must include a statement of who, where, what, and how. To whom should the education be directed? Where can the education be placed to reach these people most efficiently, most assuredly, and most effectively? What should be said; how should it be said; and how much emphasis should there be on each of the points in the educational program?

The *who* answer can be estimated by studies of such characteristics as sex, race, age, education, occupation, income, urban-rural status, etc., of persons found to have primary or secondary syphilis (*4, 5, 6*). (Aside from the immediate case-finding goal, venereal disease control and much broader health and social objectives possibly can be achieved by an understanding of the fundamental relationships of human and environmental factors to infection or the ecology of disease.) Such studies may establish the characteristics of the infected group alone or they may establish the differences between the infected group and the noninfected segment of the population. If the infected group includes persons with other stages of syphilis, or if the analysis is based only on positive blood test results, it must be recognized that some of the findings cannot be made directly applicable to the group with primary and secondary syphilis because of different age distributions and other factors that change with the progression of the disease from its early to its later stages. The group of persons having certain characteristics that should be given special attention can be determined by studying the differences between volunteers, nonvolunteers, and those volunteering with varying periods of delay after noticing symptoms of primary or secondary syphilis.

After determining who should be persuaded to seek diagnosis, it is next necessary to learn through which mediums he may best be reached. Effective lines of communication may be determined by analyzing such pertinent factors as radio or television ownership, ability to read, reading habits, and movie attendance (*5*). Crude estimates of the effectiveness of the various mediums, as judged by the study of differences among volunteers, and between volunteers and nonvolunteers, also must be taken into account to help determine through which medium the educational material will do the most good. It should not be expected that a single clear-cut answer, such as "Radio is best," will result, because the field of mass communications research is complicated and as yet is unable to cope adequately and completely with problems of coverage, exposure, attention, and other forms of impact. Also, the answers may vary from one community to another.

Results from such investigation, plus the experience and findings of those engaged in communications research, should guide us reliably in choosing effective means of communication. This phase of the research plan is the most troublesome, for it is complicated by word-of-mouth education. There is evidence to indicate (7) not only that a large percentage of persons with primary and secondary syphilis talk with others about their symptoms, but also that the advice obtained is a factor in getting some to go to diagnosis of their own accord. Thus, it is necessary to find out with whom the primary and secondary syphilis patients talk (parents, persons older or younger, sex partners) and, in turn, to find out what the lines of communication of these persons are. This will involve not only present but past talk with others.

In planning educational material, correct decisions must be made as to what should be said, how to say it, and how much emphasis should be given each factor or subject presented. It is believed that these decisions can be made on the basis of medical knowledge and by a study of differences between the volunteers and nonvolunteers, and among the volunteers seeking diagnosis at varying delay periods after noticing symptoms. Study would be made of the attitudes that motivate persons to seek diagnosis and of differences between these persons with respect to specific points of knowledge (outcome of untreated syphilis, symptoms, ease and speed of cure, location of diagnostic facilities). In studying the differences among volunteers, and between them and the nonvolunteers, it is necessary to establish cause-and-effect theories. Such theories can be developed only through a process of statistical controls. This means that if volunteers are compared with nonvolunteers on a particular factor, all other factors known to have some effect on volunteering or not volunteering must be taken into account. Over-all comparisons can be made for some items without this control, and it is possible also to draw inferences by studying the volunteer groups independently.

This general method of research will be illustrated in the following presentation of the principal results of a study of 1,098 patients who had early symptomatic syphilis. It should not be expected that this preliminary investigation or that any single study will answer all of the questions set forth, but these few findings should give indication of its profitableness.

### *Study of 1,098 Patients With Primary and Secondary Syphilis*

A start was made in 1947 in developing the research methods previously described. At that time, a plan was devised to undertake a part of this research program. The study was set up to fit in with the day-to-day working schedule of the cooperating field personnel. This was made possible by limiting the scope of the study and by providing a rule-of-thumb manual (*1*) for use in training field personnel in the objectives and methods of investigation. The scope of the study was limited in many ways because of these practical considerations. Primary attention was given to the measurement of attitudes and some of the differences between volunteers and nonvolunteers. Little attention was given in this study to the measurement of the characteristics of and the lines of communication to infected persons.

By the end of 1948, some 2,800 questionnaires were received from nine cooperating States. One thousand, six hundred and sixty-eight questionnaires which had been designed to measure attitudes have been analyzed and summarized in a report of October 1949 (7). The remaining 1,098 questionnaires had been designed to determine the differences between volunteers and nonvolunteers with primary or secondary syphilis. Partial results of the study of these 1,098 patients were discussed at the Venereal Disease Control Field Staff Conference in May 1949, and were included as general background information in an article on contact investigation in May 1949 (8). This paper covers in outline fashion the major findings of a more detailed analysis of the 1,098 interviews. (A detailed report of this study, available in the Division of Venereal Disease, U. S.

Public Health Service, includes: the method of sampling; interviewing technics; discussion of the use of time-delay in seeking diagnosis as a tool for measuring response among volunteers; the establishment of statistical controls in the analysis; the method of matching to remove bias; and numerous tables and charts.)

### Study Summary and Conclusions

Generally speaking, the following persons tended to volunteer for diagnosis and to volunteer more quickly: males, persons noticing symptoms, persons having had some previous venereal disease treatment, whites, persons with primary syphilis as contrasted with secondary, veterans, married persons, and persons 23 or more years of age. Given combinations of characteristics apparently affect volunteering; for example, 80 percent of the males and 75 percent of the whites interviewed in this study had volunteered, but 86 percent of the white males volunteered. For this reason, a system of matching the volunteers and nonvolunteers was employed so as to remove these factors when studying other factors that contributed to volunteering. Thus, it is possible to state that apart from any hidden influences of those characteristics listed above, recognition of and willingness to admit to the possibility of venereal disease infection is a factor which is associated with volunteering. Of first importance, then, is the need to convince persons that venereal infection does not occur just among others.

By the study of the distribution of question responses among volunteers and between them and the nonvolunteers, by controlling on the basic characteristics as illustrated above, and by analyzing the time-delay in volunteering, the following general conclusions have been reached:

1. Over one-third of all the patients with early syphilis who were interviewed reported nongenital symptoms only. Perhaps public educational material should give these conditions more emphasis. It may be that education regarding body rashes, swellings, and nongenital sores will result in diagnostic work being done on many noninfected individuals. We have not reached a point where this is a matter for real concern, for available data from a large number of States indicate that only 38 percent of the volunteers who had noticed symptoms were found not to be infected with venereal disease.

2. It must be recognized that 78 percent of the nonvolunteers had noticed symptoms before they were asked to go to diagnosis. It could be that the presence of their symptoms eventually might have become a factor in getting them to go for diagnosis; yet, the nature of the disease with respect to the disappearance of symptoms would militate against this action. For this reason, it is necessary for the educational material not only to mention the various symptoms, and state that they may disappear, but also to give emphasis to the need for early diagnosis.

3. Volunteers apparently are able to associate the possibility of their infection with their having been with someone who they thought might have been infected. There is apparently some factor, perhaps a feeling of guilt or anxiety on the part of the individual, quite apart from the presence of symptoms, which helps him decide on seeking diagnosis.

4. Four percent of the volunteers said that they report periodically for routine examination, and the average time-delay between noting symptoms and seeking diagnosis was for them about 1 week above the average for volunteers. Thus, though the encouragement of periodic examinations apparently helps to find cases, it does not, nor can it by its very nature, assure early diagnosis.

5. Four percent of the nonvolunteers said they did not go for diagnosis, even though they had symptoms, because they had had a negative result on a previous blood test. This indicates the possible extent to which the routine or screen testing approach to case finding, unless properly handled by giving complete explanation and interpretation of results, may be detrimental to the control program.

6. About two-thirds of the nonvolun-

teers said that they had thought of going to a clinic, and mentioned about twice as many deterring factors as did the volunteers. The more reasons given for hesitation, the smaller is the percentage of volunteers.

7. The common elements among the top three reasons for hesitating to go to a clinic for diagnosis are the uncertainty of how long the treatment takes and how difficult it is. Those of us who are close to the problem know the amazing history of how treatment time has been reduced from years to days, and we are proud to state in educational material that it is but a matter of 10 days to 2 weeks. (At the time of this study the treatment schedule ordinarily used in rapid treatment centers was 10 days.) But the general public, not having the background information, is not elated by this news. To them, 10 days is still 10 days and a lot can happen to a person in that time, either away from home in a hospital or upon repeat visits to the clinic or doctor's office.

8. Persons who are concerned about the possible tragic outcome of untreated syphilis are apt to volunteer, and to volunteer quickly. Educational material should mention the dangers of untreated syphilis, and, at the same time, explain that prompt diagnosis and adequate treatment of early syphilis will prevent the serious consequences of late syphilis.

9. Among the volunteers and nonvolunteers who mentioned fearing the possible outcome of untreated syphilis, 11 percent of the volunteers and 9 percent of the nonvolunteers stated that they were afraid of passing their syphilis to a child or some other family member, or of causing family conflict. The volunteers who voiced this fear came to diagnosis 5 days more quickly after noticing symptoms than other volunteers who did not mention fearing the outcome of untreated syphilis. This may indicate that if, in the future, more emphasis is placed on social responsibility, more patients will come quickly to diagnosis, and the spread of infection may be prevented. Also, some may not risk the possibility of exposure to infection.

10. More emphasis should be placed on informing the public of the availability of clinics and their locations. The matched volunteers and nonvolunteers have approximately the same amount of knowledge about clinics; nevertheless, it is important that one out of six or seven primary and secondary syphilis patients questioned at treatment centers had not known before their current infection that there was such a thing as a health department clinic in their home city or county.

11. Over one-fourth of the patients said they first knew of the clinic through relatives or friends. Word-of-mouth advocacy of diagnostic facilities by "satisfied customers" is a factor that should not be overlooked. Over 8 percent of the patients questioned in clinics said that they would not recommend the clinic to anyone who needed an examination for venereal disease.

12. High on the list of communications mediums which were apparently associated with volunteering are those which may tend to have personal impact: slides, pictures, movies, talk with friends and relatives, and talk with doctors or nurses. At the other end of the list are the generally impersonal formal mediums: radio, newspapers, magazines, etc. It is extremely important to educate patients while they are under treatment, for they do talk with others and may themselves need to return for diagnosis.

13. Persons mentioning some specific medium of communication as "putting the idea in their heads for having an examination" tended to come to diagnosis sooner than did those not mentioning any medium.

14. There is evidence that it is important to keep venereal disease information constantly before the public, and to maintain a sufficiently high level of knowledge, so that the apparently large amount of interchange of information by word-of-mouth is correct.

15. Infected persons do talk to others about their symptoms. Such talk, by its

very nature, may cause some delay in volunteering for diagnosis, but may also assure that the infected person will volunteer sooner or later.

These are the principal findings of the study. These findings, plus those of the more detailed report which are not subject to such brief summary, are the result of our attempt better to understand the behavior of infected persons, so that we might achieve our case-finding goals.

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# Syphilis Prevalence and Community Structure[1]

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### Statement of the Problem

As case finding becomes the central problem in the control of syphilis, it is increasingly important that this activity yield the greatest return for the investment.

In the investigation of contacts of patients infected with syphilis, case finding is directed at a population group where the rate of infection is known to be high. If similar direction could be given to other types of case finding, effectiveness would be increased.

The experience gained in several case-finding programs indicates that a large proportion of any specified group, or of a total population, will volunteer for blood tests. In some instances, however, the number of cases of syphilis found by voluntary blood tests is not sufficiently high to justify the effort expended. Results indicate that it would be rewarding to develop methods for directing blood-testing programs toward groups which are likely to have high syphilis rates. The conclusion of any mass blood-testing program also leaves an unanswered question: How do those persons who do not respond to the program differ from those

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[1] This paper summarizes a longer work, "Syphilis Prevalence and Community Structure: Basic Report," which may be consulted upon request to Dr. Theodore J. Bauer, Chief, Division of Venereal Disease, U. S. Public Health Service, Washington 25, D. C.

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who do respond? In particular, is there more undiscovered syphilis in the untested group than was found in those tested?

It has been demonstrated that knowledge of syphilis—specifically, the serious nature of the disease, the signs and symptoms of early syphilis, the possibility of cure, and the location of diagnostic facilities—can be imparted to the general public, and that the imparting of such knowledge results in an increase in the number of new cases reporting for diagnosis (*1*, *2*). It is important that groups of the population with higher prevalence and incidence rates be identified, so that activities can be directed toward them and attractive, understandable educational materials can be designed.

The existence of differential prevalence rates in various population groups in this country is well known. Analysis of results of the blood tests taken on the first two million selectees shows large differences, both geographic and racial. These results also indicate varying rates for different occupational groups, and for groups classified by marital status (*3*). In a study of the correlation between syphilis prevalence and certain socioeconomic factors in Savannah, Ga., (*4*), other differences were noted. In general, the syphilis prevalence rate by marital status was: highest, widowed; second, divorced or separated; third, single; and lowest, married. Study of the relationship between syphilis prevalence and education indicated that the rate for those with the greatest amount of education was much lower than for those with the least. A study of groups by occupation indicated that those with high status and income show lower syphilis prevalence than do those of low status and income. These findings were true for each race and sex category.

The present study attempts to apply methods of social research to identify those population groups in which syphilis prevalence is apt to be high. Case-finding efforts involving mass blood testing or public education then could be directed more specifically at such groups. In addition, an attempt is made to determine in which respects the respondents to a typical mass-testing program differ from those who do not respond.

## Description of Research Methods

For several years the Georgia Department of Public Health, in cooperation with local authorities, has conducted community-wide programs of mass blood testing combined with chest X-ray. Public response has been excellent. Plans were made to study the social class structure in a community scheduled for such a program in order to correlate the results of blood testing with class structure. This would provide a factual statement of the social characteristics of groups with high syphilis prevalence rates and of groups with low syphilis prevalence rates. A town in Georgia[7] was selected as the locale for the study.

Study of American communities indicates an organization of our society into a system of social classes identified by characteristics of the individuals composing each of these classes. In a general pattern, social classes in American communities fall into six groups: upper and lower divisions of an upper class, upper and lower divisions of a middle class, and upper and lower divisions of a lower class. These groups are marked by differences in living standards; source and amount of income; social, civic, and recreational activity; and the attitudes and beliefs of individuals regarding themselves and their fellows. Identification of class groups in Studytown, subsequent identification of individuals within the groups, and determination of differential prevalence of syphilis among these various social classes were the purposes of this social study.

Recognition of the classes and identification of individuals within each class were accomplished by the methods of *Evaluated Participation* and the *Index of Status Characteristics*. (These two methods are described in detail in Social Class in America (*5*) with instructions for their use.) *Evaluated Participation* is the analysis and description of community groups as accomplished from interviews with residents of the community. Trained interviewers collect data from the residents describing the existence groups, the relationship of the groups to each other, and influence of the groups on the lives of their members and others. Erroneous information possible because of personal prejudice and personal bias in informants is discounted by collection of a large number of interviews. The *Index of Status Characteristics* is a method of placing the individual in the group with which his personal life identifies him.

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[7] Hereafter referred to as Studytown.

### Socioeconomic and Social Class Levels

The white population in Studytown (3,350 persons 12 years of age and over) is divided into five of the six classes which were named previously, the upper upper class being absent. The comparatively recent establishment of the town has prevented emergence of an "old family" group as a distinct social class with the political, economic, and social dominance characteristic of that group. The population is distributed among the five other classes. The largest proportion, 35.6 percent of the population 12 years of age and over, is in the lower middle class; 25.8 percent are in the two classes above; and 39.5 percent are in the two below.

The traditional upper class in America tends toward religious membership in the Quaker, Congregational, or Episcopal Churches. In Studytown there are only four major churches — Presbyterian, Methodist, Missionary Baptist, and Primitive Baptist, and less than 1 percent of the white population claimed membership or preference for one of the churches in the first group. The Presbyterian church was listed by 3.94 percent; the Methodist, by 25.89 percent; and the two Baptist denominations, by 63.22 percent. Only 3.44 percent failed to list a church membership or preference. Upper class white persons attend church more regularly than the lower class white persons (fig. 1).

The same pattern emerges in associational membership and attendance (fig. 2) as is found in church activity, and there are more upper class members who belong to more than one organization. It is apparent that higher class status is accompanied by a greater amount of social and religious activity, in addition to the informal kinship and friendship interaction in which individuals spend much of their daily lives.

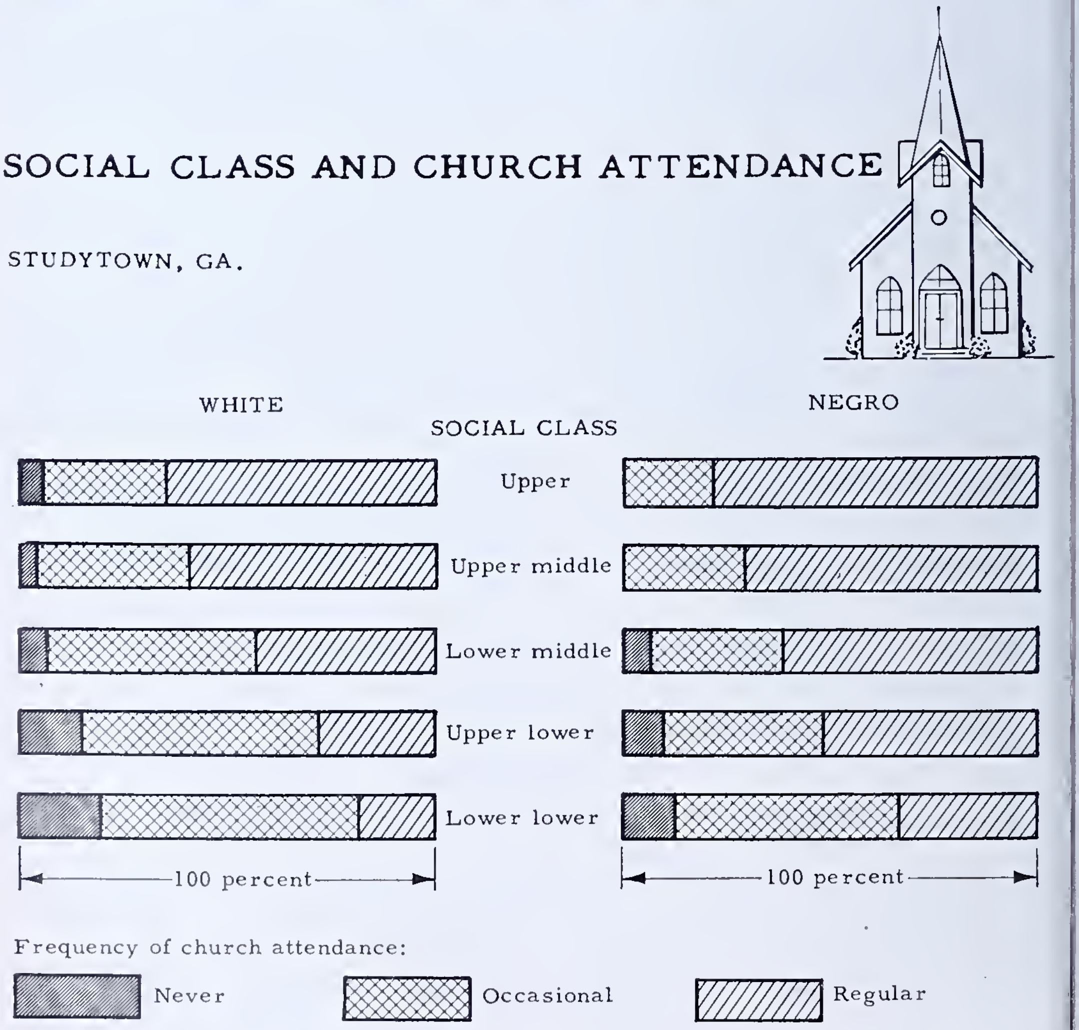
In Studytown, the upper class is distinguished primarily by two factors: money or family, or both. The upper class has an established tradition of community service, social prestige, and behavior codes; money alone does not provide an entree to this group. There might be a family or individual whose financial status meets the standard, but who, having lived in the community less than 25 years, would be considered a "newcomer"—no one in the community knew his grandparents.

In this upper class there is a definite awareness of community needs for progress—civic and cultural. Members of this group can and often do initiate action toward these ends. Influence is exerted upon prominent political and civic figures (usually upper middle class) through kinship or friendship, and any action or program usually requires the approval of the upper class for its success.

The upper middle class is not separated from the upper class by a particularly strong dividing line. It includes some children of the upper class who work, but may later inherit money. It also includes professional and business men who are excluded from the upper class by financial lack only. They, too, are usually active in the cultural advancement of the community. They are often referred to as "younger" and "more progressive" than the upper class. A few upper middle class individuals are found in upper class organizations through kinship connections, their habits and attitudes being identical with those of the upper class but their financial status lower.

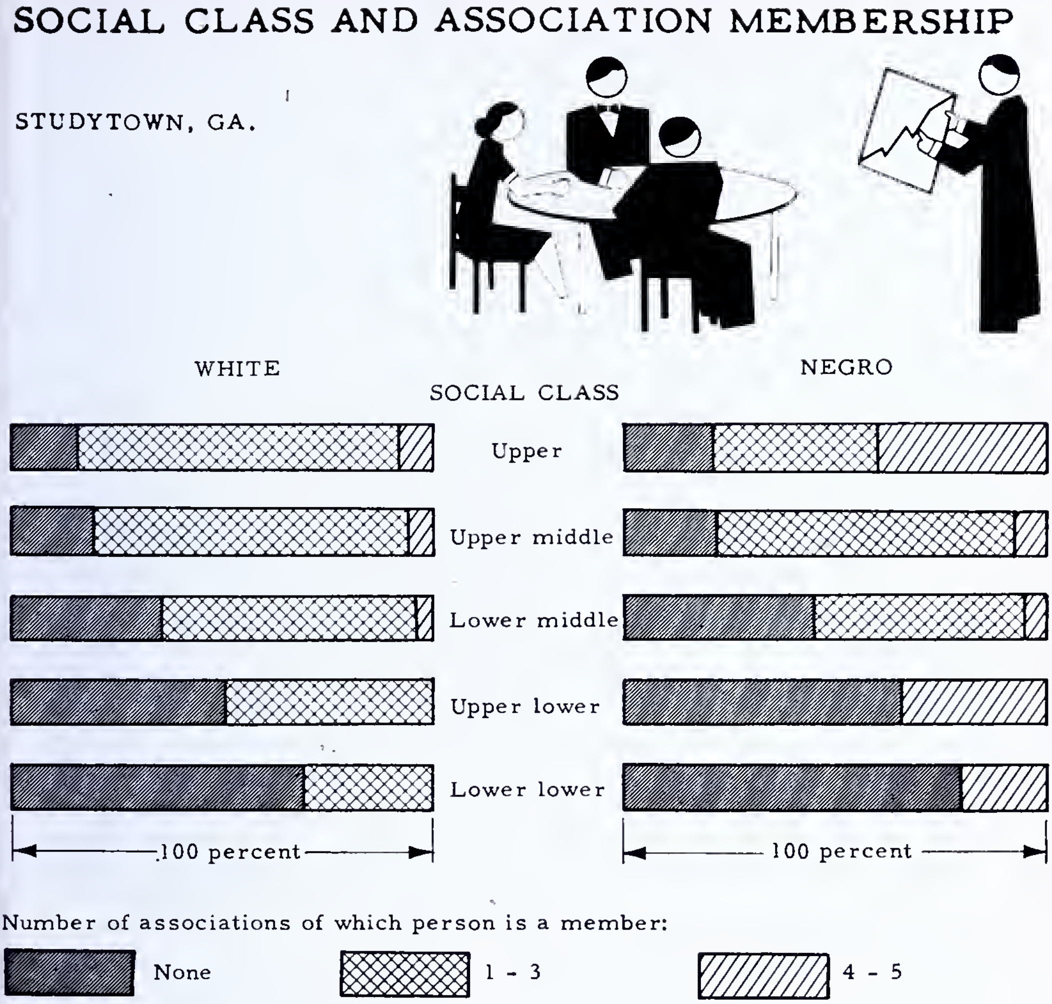
Both upper class and upper middle class were willing and often eager to enter into plans for public health services. They realized the need for increased health education and benefits to the community, and were receptive to rational plans. The upper middle class was found to spend a sizable proportion of income on taxes, education, medical care, and insurance. They were directly approachable on problems of venereal disease and control methods, because they were interested and aware of its signifiance in any community.

The lower middle class, in which we found the largest proportion of the white population, is composed of small businessmen, skilled workers, some professional persons, and minor Government employees. In this group appeared some widows and other women who, though employed, did not work of necessity, because they had small incomes from property or insurance. Except for a few marginal individuals, the break between this class and the upper middle class is fairly definite. The lower middle class appeared to be more conventional in religious attitudes and recreational patterns. There is little time or money for purely social functions or organizations, such activities being found in church and school organizations primarily. They rarely approve of alcohol even as a social amenity, considering it a bad influence on home and family.



NOTE: Persons not giving attendance information are excluded.

FIGURE 1.



NOTE: Persons not giving information are excluded.

FIGURE 2.

The upper lower class might be termed the "sober poor." It includes mill hands and manual workers whose wives may be laundresses. They drink little or not at all, have no time for purely social or recreational pursuits, but follow as much as possible the patterns of the class above in furnishing their homes and in their religious behavior. These two classes recognize the line that divides them, but their attitudes and ideals regarding family, church, and social responsibilities are essentially the same.

Both lower middle and upper lower classes are more responsive to appeals stressing religious and family themes than are the two higher classes. Discussions of sex are not welcomed, nor do these people react positively toward the problems of venereal disease control. Health programs are more effectively extended in general terms.

The lower lower class in Studytown was recognized by all informants. Few members of this group have steady or gainful employment, as they lack the necessary economic and social skills. Indications were clear that as a group they deviate more from the existing moral code than any of the other groups. Their kinships are extensive, but family relationships are often very poor, characterized too often by family fights, neglected children, and marriages ending in separation and desertion. There is frequent drunkenness, sexual promiscuity, and juvenile delinquency. Church membership and attendance are less frequent, and organization membership practically nonexistent. For this class, appeals for health education are most successful when made on an emotional basis and to self-interest rather than to community-interest. There is much misinformation in medical knowledge, and this misinformation is faithfully handed down from mother to daughter. The group may respond to sex education, but only from an authority—a doctor, minister, or social worker—in whom they have trust.

### Social Class Levels Among Negroes

Social class status among Negroes depends less on material symbols than on the intangible factors of morals, speech, and the proprieties of dress and manner. This difference is a natural consequence of the Negro's restricted living standard in this locale. While the significance of material symbols is the same as for whites, it is not as important or as pervasive in determining the status structure of the Negro community.

The Negro community (1,641 persons 12 years of age and over) has the same class groups as the white, but the distribution of population within them is different. The upper class represents only one-third of 1 percent of the study population; the upper middle class, 1.6 percent; the lower middle class, 9.2 percent; the upper lower class, 25.9 percent; and the lower lower class represents the majority, 63.0 percent, of the Negro group.

Associational activity and religious membership or preference follow almost exactly the same patterns among the Negroes as they do among the whites. It is interesting, and could be of useful significance in conducting a study of this kind, that church attendance in each class of the Negro population is greater than in each class of the white population (fig. 2). It is also true that, as in the white population, the higher the social class of the Negro, the greater the church attendance. The church is, for the average Negro, the center of his social life, and has a vital significance in his personal life as the greatest outlet for his emotional needs.

The Negro upper class is composed of businessmen and a few professional persons. They own property, have stable families and good reputations. They are well educated and pattern their dress, speech, and manner after the upper class white. The white community respects and recognizes their achievements, and the Negro population looks to this group for leadership in social and civic life.

The upper middle class of Negroes includes home owners, teachers, and ministers. They are active in church and social affairs, and have many contacts with white persons through employment by them. They serve in a liaison capacity, interpreting to the white community the aspirations and needs of the Negro community, and to the Negroes the acceptable activities which will secure these goals for them. The county health nurses maintain close contact with members of this group, who are cooperative and helpful in promoting health education and programs, and in helping to locate reported cases of infectious disease.

The Negro lower middle class consists of young professional and semiprofessional persons. It contains families of ambition, good education, and reputation. They own their homes but lack the social skills and personal qualities required of those in the upper middle class. The younger school teachers, insurance salesmen, and funeral directors are found in this group.

Reputable church members, those with steady jobs, or the so-called decent people compose the Negro upper lower class. The lower middle and upper lower classes bridge the gap between the upper groups and the lower groups. They furnish the core of moral individuals who set the prevailing tone of the churches and fraternal associations. They have a sincere desire to improve their race. They are critical of those in the upper and upper middle classes who sacrifice racial interests and advancement for social and personal gain; they strive to hold the groups together where general aims and interests are concerned.

The lower lower class is made up of unskilled domestic and manual workers. The groups above them consider these persons to be without ambition and to have little or no personal pride. They take no part in group activities, church or associational, and they view their fellows and the community only in terms of narrow, personal interests. They are censured by the higher groups for their immorality and because they create a bad impression of the Negro community.

The lower lower class group has a meager knowledge of health matters. They have many home remedies based on superstition and folklore, and are resistant to newer medical knowledge. Health education must be translated into their terms before it can be understood and accepted. They consider the Negro classes above them to be rather remote and uninterested in their welfare. This group has a close relationship to the white people in the community because many of them are domestic workers, and the Negro usually finds his white employers understanding and helpful. To them as well as to the average white person, such white dominance and Negro subordination is both natural and expected.

### The Mass Blood-Testing and X-ray Program

In November 1949 the mass blood-testing and X-ray program was started in Studytown. It lasted for approximately 3 weeks. In this program, as in others throughout the State, an intensive publicity campaign acquainted the population with the dangers of untreated syphilis, symptoms of the disease, and possibilities of cure. Many persons not in the public health field participated in the educational and testing programs; and feature articles, editorials, advertisements, and schedules of blood-testing stations appeared in the local newspapers. Venereal disease information was broadcast by nearby radio stations. Announcements were made from sound trucks roving through selected sections, and popular records were played between announcements. Large street signs were placed at strategic spots throughout the city. Cooperation was obtained from the private physicians, local churches, and industrial, social, and civic organizations.

### Degree of Cooperation in Original Survey

Response to the program was best in the Negro groups, with over 80 percent of the study population participating. Only 64.2 percent of the white groups had tests during the initial survey period. In both races, the males showed a 1-percent better response to the survey appeal than did the females.

The best response was secured in those of school age. This was logical since all schools were surveyed. The poorest response was among those over 65 years of age.

With regard to social class, response was best in the lower middle class group, the only deviation from this rule being the white males. Among white males the lower class groups showed progressively better response.

In the white population no definite pattern of syphilis prevalence can be established as only 12 persons, or 0.6 percent of the 1,977 tested, had positive blood tests. No doubtful tests were discovered.

Since response from the Negro population was best, and since a higher rate of positive and doubtful blood tests was observed in this group, a resurvey of this group was scheduled in an effort to secure 100-percent coverage of the Negroes. A follow-up worker checked all recent[8] serologic tests for syphilis made by the health department and by private physicians. He asked all nonrespondents to the first survey, who had not had recent[8] treatment or a recent[8] serologic test for syphilis, to come to the clinic for testing. Virtually complete success was achieved—only five persons out of the Negro study population failed to receive tests or to produce evidence of recent test or treatment.

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[8] Since September 1, 1949.

## Reasons for Noncooperation by Negroes in Original Survey

No general statement can be made as to why those tested in the resurvey failed to get their tests in the initial program. The 11 persons in the lower middle class group were either teachers, students, or professional people and all said they were ill or absent from the community at the time of the initial survey. Most of the upper lower groups gave the same reasons, or told of periodic check-ups by private physicians, some of which were verified. The lower lower class group showed general apathy regarding their health, and many looked with suspicion upon all activities of the health department.

In general, the higher social class groups were more cooperative in the resurvey than the lower group. They understood the project aims more readily, and several of them helped in securing cooperation among the two lower classes. Reluctance to cooperate on the part of the lower classes seemed due to misinformation about venereal disease and about the rapid treatment center.

## Results of Serologic Tests for Syphilis: Negro Population

That the higher percentage of positive and doubtful results is in the lower social classes is obvious from the figures for the total population (table 1). Analysis of the results for each sex (table 2), however, indicates that this is due to the close relationship between class and serologic status in the females. The picture is not so definite for the males. It is interesting to note that this closer relationship between social class and serologic status in females than in males was also found in a previous study (*4*). The percentage of positive and doubtful blood tests discov-

Table 1.—*Total STS* [1] *results, Negro study population, Studytown, Ga.*

| Social class | Negative |  | Positive and doubtful |  | Total significant results |
|---|---|---|---|---|---|
|  | Number | Percent | Number | Percent |  |
| Upper | 4 | 100.0 | 0 | 0 | 4 |
| Upper middle | 22 | 91.7 | 2 | 8.3 | 24 |
| Lower middle | 134 | 91.2 | 13 | 8.8 | 147 |
| Upper lower | 369 | 87.6 | 52 | 12.4 | 421 |
| Lower lower | 885 | 85.1 | 155 | 14.9 | 1,040 |
| Total | 1,414 | 86.4 | 222 | 13.6 | 1,636 |

[1] Serologic test for syphilis.

Table 2.—*Total STS* [1] *results, by sex, Negro study population, Studytown, Ga.*

| Social class | STS results |  |  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|
|  | Males |  |  |  |  | Females |  |  |  |  |
|  | Negative |  | Positive and doubtful |  | Total significant results | Negative |  | Positive and doubtful |  | Total significant results |
|  | Number | Percent | Number | Percent |  | Number | Percent | Number | Percent |  |
| Upper | 1 | 100.0 | -------- | -------- | 1 | 3 | 100.0 | -------- | -------- | 3 |
| Upper middle | 6 | 85.7 | 1 | 14.3 | 7 | 16 | 94.1 | 1 | 5.9 | 17 |
| Lower middle | 61 | 92.4 | 5 | 7.6 | 66 | 73 | 90.1 | 8 | 9.9 | 81 |
| Upper lower | 157 | 84.9 | 28 | 15.1 | 185 | 212 | 89.8 | 24 | 10.2 | 236 |
| Lower lower | 417 | 85.8 | 69 | 14.2 | 486 | 468 | 84.5 | 86 | 15.5 | 554 |
| Total | 642 | 86.2 | 103 | 13.8 | 745 | 772 | 86.6 | 119 | 13.4 | 891 |

[1] Serologic test for syphilis.

ered was practically the same for males as for females in the total population.

Practically the same picture is presented when the results of the tests taken in the first survey only are analyzed.

### Serologic Status of Respondents and Nonrespondents to First Survey

A comparison of the serologic status of respondents to that of nonrespondents in the first survey should indicate answers to two questions:

1. Can the prevalence rate (as measured by positive and doubtful blood tests) indicated by the first survey be considered representative of the prevalence rate in the total study population?

2. Was there a higher rate of previously unknown cases of syphilis among those persons who did not respond to the survey appeal than among those who did?

The rate of positive and doubtful blood tests found among Negroes, 12 years of age and over, who were tested by the survey team in Studytown was 13.1 percent. The rate among males was 13.3 percent, and among females, 12.8 percent. The rate in the total Negro study population of Studytown was 13.6 percent with the rate for males being 13.8 percent and the rate for females being 13.4 percent. Thus, the prevalence rate as indicated by the findings of the initial survey team was very close to that found in the total study population.

To find an answer to the second question all previously known cases were omitted from the analysis, and a comparison was made between those persons tested at the time of the original survey and those persons tested through subsequent follow-up activities. Among Negro males in Studytown, there was a slightly higher rate (3 out of 57 persons) of previously unknown cases of syphilis in the nonrespondents. Among the females, there was three times as high a rate (8 out of 68 persons) in the nonrespondents. Thus, the males showed a slightly higher rate, and the females a considerably higher rate, of previously unknown cases of syphilis among those persons who did not respond to the survey appeal than among those who did.

### Previous Treatment Status: Negro Population

In the Negro study population, two-thirds of the persons with positive and doubtful serologic tests had been previously treated for their infection. A larger percentage of males than females had a history of previous treatment (table 2), probably because the early symptoms of syphilis can be more readily perceived in the male than in the female. In the males there is a slight indication of direct relationship between social class and the percentage of positive and doubtful tests with history of previous treatment; that is, a larger percentage of the cases of syphilis in the higher social classes have been previously discovered. This is in direct contrast to the Negro females. In this group there is an inverse relationship between social class and percentage with history of previous treatment, a smaller percentage of the cases of syphilis in the higher social classes having been previously discovered.

These differences, though small, may reflect the relative effectiveness of current methods of case finding among males and females. The male, able to perceive his symptoms and their implications more readily, responds to case-finding methods which help the infected person to recognize his symptoms and so to seek treatment voluntarily. Such case-finding methods would normally have a greater impact on the more educated members of the community. On the other hand, since early symptoms are less readily perceived in the female, a larger proportion of infected females will be discovered through routine blood-testing activities. And it is probably true that the routine blood-testing activities of the health department may reach a greater percentage of the lower social classes.

### Summary

1. In the summer of 1949, a census was made of adults living in Studytown, Ga., and, from the material gathered, a

study was made of the social class structure of the community. In November, a community-wide mass blood-testing and chest X-ray program was conducted. The results of the blood tests and subsequent diagnostic procedures were compared with the data secured from the earlier social study.

2. In the white population, only 12 positive blood-test results were obtained from the 1,977 persons tested. Sixty-four percent of the white population was tested.

3. Eighty percent of the Negro population responded to the initial blood-testing campaign, and, through letters and visits, blood tests were secured on the remainder.

(*a*) Of the Negro males, 13.8 percent showed a positive or doubtful result to the blood test. Of the females, 13.4 percent showed a positive or doubtful result.

(*b*) Higher percentages of positive and doubtful results were found in the lower social classes. This finding was more pronounced among the females than among the males.

(*c*) The prevalence rate of positive and doubtful tests found in the initial campaign was 13.1 percent and the prevalence rate found in the total population was 13.6 percent.

(*d*) In comparing the percentage rates of previously unknown cases of syphilis between the first and second surveys, the rates for both males and females were higher in the second survey. The difference for females was considerably higher than for males. The respective rates for the first and second surveys are 4.0 and 5.3 for males and 3.7 and 11.8 for females.

(*e*) In the Negro population, two-thirds of those with positive or doubtful tests had been previously treated for their infection. This fraction was larger for the males than for the females. Among the males with positive blood tests, there was a slight indication of a direct relationship between social class and the percentage with previous treatment for syphilis. Among the females, this relationship was an inverse one.

## References

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# CURRENT LITERATURE

## A. M. A. Am. J. Dis. Child., Chicago

Physiological deviations of the premature infant, with summary of principles of care. Helen Reardon, James L. Wilson, and Bruce Graham. A. M. A. Am. J. Dis. Child., 81: 99–138, Jan. 1951.

In this review of the literature and general discussion of the problem, causes, and prevention of premature births, and care of premature infants, the problem of the recognition of syphilis in the premature baby is briefly discussed. Although as high a percentage of premature infants born in the United States do not have syphilis as previously believed, prematurity may be a result of syphilis. Therefore, this diagnosis for any premature infant should be routinely excluded.

## Am. J. Syph., Gonor. & Ven. Dis., St. Louis

Immunochemical studies of the Reiter spirochete. Abraham Gelperin. Am. J. Syph., Gonor. & Ven. Dis., 35: 1–13, Jan. 1951.

The first part of the study presented results of an attempt to protect rabbits against infection with known numbers of *Treponema pallidum* through immunization with Reiter spirochetal vaccines. This was unsuccessful, in that all rabbits in the experiment developed syphilitic lesions. The second part dealt with physical, chemical, and immunologic analyses of tryptic digest fractions of Reiter spirochetes. Three fractions (K, L, and M) were obtained. All three were serologically active with rabbit antiserum to the whole spirochete. Fractions K and L were serologically active to a slight degree with normal rabbit and human serums.

The cultivation of pleuropneumonia-like organisms from the human genitourinary tract with reference to their possible venereal transmission. Harry E. Morton, Paul F. Smith, and Paul R. Leberman. Am. J. Syph., Gonor. & Ven. Dis., 35: 14–17, Jan. 1951.

A liquid medium containing selective bacteriostatic agents capable of inhibiting the growth of both gram-negative and gram-positive bacteria is described which facilitates the isolation of pleuropneumonia-like organisms (PPLO) from clinical specimens contaminated with bacteria. A practical medium for cultivating PPLO is also described. With the use of this medium, a series of cultures was made on 85 patients at the urology clinic of the University of Pennsylvania Hospital. There was a positive percentage of 24.7 in the group.

Tissue reaction in the anterior chamber of the rabbit eye produced by *Donovania granulomatis*. Robert B. Dienst, Calvin H. Chen, and Robert B. Greenblatt. Am. J. Syph., Gonor. & Ven. Dis., 35: 18–20, Jan. 1951.

Rabbit eyes showed acute inflammatory reactions in 24 hours after being inoculated with 0.2 cc. of 2-day-old fresh yolk agar culture of *Donovania granulomatis* containing approximately 20,000 organisms. The anterior chamber fluid was replaced with a yellowish white mass which persisted throughout the 331 days of observation. No *D. granulomatis* could be demonstrated in any of the tissues.

Studies on increasing the sensitivity of the treponemal immobilization test for syphilis. Frederick A. Thompson, Jr., and Harold J. Magnuson. Am. J. Syph., Gonor. & Ven. Dis., 35: 21–34, Jan. 1951.

Blood specimens from 126 patients with syphilis were obtained at the Eastern and Western Medical Centers in North Carolina, and the in vitro tset for immobilizing antibodies against *Treponema pallidum* was run by the method previously reported. The immobilization test, altered to make it more sensitive by increasing the final concentration of guinea pig serum, was run on 409 serums from syphilitic patients and 72 serums from normal human beings. With the altered method, the number of negative immobilization tests in patients with secondary syphilis was reduced from approximately 12 percent to 2 percent.

Skin testing with a purified suspension of *Treponema pallidum.* Lydia C. Marshak and Stephen Rothman. Am. J. Syph., Gonor. & Ven. Dis., 35: 35–41, Jan. 1951.

Preparation of the purified suspension is described. When this suspension was injected intradermally on the flexor surface of the forearm, six normal persons and six patients with secondary syphilis yielded negative results. Three patients with gummas and seven of eight patients with prenatal syphilis gave positive reactions. The authors conclude that tertiarism is associated with the development of a tuberculin-type hypersensitivity.

Auzias-Turenne's syphilization method in Norway. An unsuccessful attempt at biologic syphilis therapy in the middle of the last century. Stian W. Erichsen. Am. J. Syph., Gonor. & Ven. Dis., 35: 42–52, Jan. 1951.

This historical report deals with the method of treating syphilis in Norway between 1852 and 1880. Syphilization, the term applied to attempted immunization by implanting the disease, was carried on by William Boeck. This method was first used in France by Auzias-Turenne.

Third generation syphilis. Gordon C. Sauer. Am. J. Syph., Gonor. & Ven. Dis., 35: 53–56, Jan. 1951.

A case history of a family with syphilis in three generations is reported. The evidence supports the probability that the mother in the second generation had congenital syphilis, and that two of her children had congenital syphilis. Objective evidence of congenital syphilis in the second generation mother was the presence of characteristic deep rhagades at the angle of the mouth.

The treatment of secondary syphilis with procaine penicillin and aluminum monostearate—a progress report in evaluation of therapy. W. H. Aufranc and Eleanor V. Price. Am. J. Syph., Gonor. & Ven. Dis., 35: 57–66, Jan. 1951.

Study is a composite report on two series of patients and reflects experience of a number of investigators. One series was treated with three schedules of one, two, and four injections of 1,200,000 units. The highest cumulative re-treatment rate and lowest rate of seronegativity occurred among patients treated with one injection. The second series was treated with a one-injection schedule with units of penicillin per kilogram of body weight varying from 1,250 to 80,000. Preliminary results indicated that a single injection of procaine penicillin in oil with 2 percent aluminum monostearate was as effective as a similar amount administered in divided doses at weekly intervals.

Treatment of early syphilis with four weekly injections of procaine penicillin and aluminum monostearate. Preliminary report. William C. Buschemeyer, Adolph B. Loveman, and Fred B. Zaugg. Am. J. Syph., Gonor. & Ven. Dis., 35: 67–71, Jan. 1951.

A total of 102 patients with primary and secondary syphilis was treated with weekly injections of 300,000 units of procaine penicillin and aluminum monostearate for four consecutive weeks. Clinical cures of patients followed are 94.7 percent. More than 85 percent of the patients have been followed for more than 6 months. This study was done at the University of Louisville School of Medicine.

Penicillin therapy of nontabetic spinal cord syphilis. Rudolph W. Jones, Jr., Albert Heyman, William A. Smith, and Richard Wilson. Am. J. Syph., Gonor. & Ven. Dis., 35: 72–78, Jan. 1951.

This report from Emory University School of Medicine presented results of penicillin therapy in 19 patients. In 5 patients with mild to moderately severe meningomyelitis of less than 3 months' duration, excellent clinical results were obtained. Little or no improvement occurred in patients with myelomalacia from vascular occlusion or in patients with degenerative changes caused by long-standing spinal cord damages.

Nongonococcal Neisserian strains isolated from the genitourinary tract. Jean Johnston. Am. J. Syph., Gonor. & Ven. Dis., 35: 79–82, Jan. 1951.

In this report from the laboratories of the Venereal Disease Clinic, Oakland Department of Health, 43 cultures positive for Neisserian organisms suspected of being nongonococcic were picked in pure culture. Thirty-one cultures were identified as *Neisseria sicca*, while 12 were identified as *Neisseria subflava*. When compared to gonococcic colonies, those of nonpathogenic Neisserian strains were larger, more pigmented, and showed oxidase reaction as a black ring on the periphery of the colonies.

The use of oral penicillin in a buffered sulfonamide mixture in the treatment of acute gonorrheal urethritis. Philip B. Johnson, John H. Seabury, and David M. Dumville. Am. J. Syph., Gonor. & Ven. Dis., 35 : 83–87, Jan. 1951.

In this study from the Louisiana State University of Medicine, 192 patients with acute anterior urethritis were studied. Of these, 150 had positive cultures, while nonspecific urethritis was present in 42. Only 92 of the 150 were available for final evaluation. Satisfactory cure rates were obtained when 16 gm. of sulfonamide mixture and 500,000 or more units of penicillin were given orally over a 5-day period.

Cortisone in interstitial keratitis. Editorial. Am. J. Syph., Gonor. & Ven. Dis., 35 : 88–89, Jan. 1951.

Indications are that cortisone used topically either in drops or as an ointment will be an extremely valuable therapeutic agent. Conflicting results may be due to basic pathology of interstitial keratitis and the time at which treatment was inaugurated. If used before there is actual necrosis in the cornea, favorable results may be expected.

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## Ann. Int. Med., Lancaster

The syndrome of compression of the pulmonary artery by a syphilitic aortic aneurysm resulting in chronic cor pulmonale, with report of a case. Julius R. Pearson and E. Sterling Nichol. Ann. Int. Med., 34 : 483–492, Feb. 1951.

This relatively rare syndrome was found in a 33-year-old Negro patient at the James M. Jackson Memorial Hospital. The pathogenesis and some of the symptoms complicating diagnosis of this syndrome are described and discussed. The case presented here is considered unique inasmuch as an intraventricular block existed throughout its entire course.

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## Brit. M. J., London

Vaginal discharge. Brit. M. J., No. 4698 : 135, Jan. 20, 1951.

This is a résumé of an address by Dr. Margaret Hadley Jackson at a meeting of the Devon and Exeter Medico-Chirurgical Society on December 21, 1950. Diagnosis and treatment of vaginal discharges, including those due to *Trichomonas vaginalis*, are discussed. In a series of 468 women attending the Whitechapel Clinic, 232 were found to have *T. vaginalis*. Of these, 102 also had gonorrhea.

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## Bull. New York M. Coll., Flower & Fifth Ave. Hosps., New York

Erythroblastic anemias of childhood with special reference to the mechanism of the production of the bone changes. Savas Nittis. Bull. New York M. Coll., Flower & Fifth Ave. Hosps., 13 : 78–90, 1950.

The clinical and hematologic symptoms of the various types of "plastic" anemias in childhood are discussed. Among the anemias considered the author mentions paroxysmal hemoglobinuria, occasionally occurring in congenital or acquired syphilis. This condition is amenable to successful antisyphilitic treatment, even though hemolysis continues to be demonstrable in vitro.

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## Bull. School Med. Univ. Maryland, Baltimore

Department of Obstetrics. Statistical summary July 1, 1949 through June 30, 1950. Bull. School Med. Univ. Maryland, 36 : 28–37, Jan. 1951.

Information is presented on maternal and infant mortality, types of delivery, other operations and procedures, complications, etiology of neonatal mortality, and maternal morbidity. Syphilis figures are included.

## CHRON. WORLD HEALTH ORGAN., GENEVA

Symposia on syphilis. Chron. World Health Organ., 5 : 9–15, Jan. 1951.

Papers read at the syphilis symposiums in Helsinki, September 4 to 10, 1950, and in Paris, September 25 to October 7, 1950, are reviewed. Major topics of discussion were early syphilis, prenatal and infantile syphilis, neurosyphilis, and serology in syphilis.

## EAST AFRICAN M. J., NAIROBI

Venereal disease in Masai. A field survey—June and July 1950. D. H. McKay. East African M. J., 27 : 451–457, Nov. 1950.

The incidence of gonorrhea and syphilis among the Purko and Kaputiei sections of the Masai is reported, and a comparison is made with results obtained 20 years ago. The present survey revealed that there has been little change in the high incidence of gonorrhea in the last 20 years, and that in the same period syphilis has increased alarmingly from a trivial incidence to the position where possibly one in every five persons becomes infected. The method of carrying out this investigation and the treatment given when required are described.

Health education in Buganda. A survey of recent work. R. G. Ladkin. East African M. J., 27 : 447–458, Dec. 1950.

The author discusses the health education program in Buganda and the programs conducted during two Health Weeks held during the past year. Films on various subjects, including yaws, were shown during the Health Weeks.

## ILLINOIS M. J., CHICAGO

Presentation of three cases. Edwin F. Hirsch. Illinois M. J., 99 : 95–102, Feb. 1951.

Case histories of three patients treated at St. Luke's Hospital, Chicago, are presented and discussed. The cases included one in which a clinical diagnosis of syphilitic heart disease and syphilitic aortitis with aortic insufficiency was made and one in which the anatomic diagnosis at autopsy included findings of syphilitic atherosclerosis of the aorta and its main branches.

## J. INVEST. DERMAT., BALTIMORE

The nature of the inclusion body of verruca vulgaris: a histochemical study of nucleotids. Harvey Blank, Minerva Buerk, and Fred Weidman. J. Invest. Dermat., 16 : 19–30, Jan. 1951.

The authors review the literature and report the results of an investigation of some of the important chemical changes which occur in the infected epithelial cells. The study included 65 patients, comprised of 51 with verruca vulgaris, 2 with v. plana, 4 with v. filiformis, 2 with v. palmaris or plantaris, and 6 with condylomata acuminata. Detailed results are presented. The findings aid in making an accurate microscopic diagnosis of the disease, and also provide evidence for a mechanism of virus multiplication.

## J. KENTUCKY M. A., BOWLING GREEN

A review of cesarean section in a small hospital. S. H. Flowers. J. Kentucky M. A., 49 : 104–107, Mar. 1951.

A review of 88 cesarean sections performed at the Middlesboro Hospital between January 1946 and July 1950 is presented. Venereal warts filling the vagina necessitated section in three of these cases.

## J. M. A. GEORGIA, ATLANTA

Diagnosis and treatment of granuloma inguinale. Rudolph W. Jones. J. M. A. Georgia, 40 : 33–34, Jan. 1951.

Granuloma inguinale may produce considerable destruction of the genitalia or other tissues if prompt diagnosis and treatment is not given. Early diagnosis can usually be made by Wright's stain of impression smears from the lesions or by histologic examination of biopsy specimens. Oral administration of either aureomycin, Chloromycetin, or terramycin is recommended.

First year's experience with the State premarital law. Georgia Department of Health. J. M. A. Georgia, 40 : 83–84, Feb. 1951.

During the calendar year 1950, 92,328 premarital blood examinations were made by approved laboratories. Of these, 4,128 were positive, 815 doubtful, and 87,385 negative. Operation of the law, which became effective August 25, 1949, and some proposed amendments are discussed.

J. OBST. & GYNAEC. BRIT. EMP., ALTRINCHAM

The management of the syphilitic mother in pregnancy. S. H. Riterband. J. Obst. & Gynaec. Brit. Emp., 57 : 931–936, Dec. 1950.

After reviewing the literature the author discusses the diagnosis of syphilis in pregnancy, false-positive serologic reaction, negative serologic findings in syphilitic women, treatment of syphilis, ideal follow-up of the infant, and treatment of the mother in later pregnancies. A brief résumé is presented of treatment and delivery of 30 pregnant syphilitic women at the Hammersmith Hospital during 2 years.

J. PHILIPPINE M. A., MANILA

"Ping-pong syphilis"—report of a case. Emiterio M. Laqui, Amadeo U. Duque, and Jose C. De Jesus. J. Philippine M. A., 26 : 475–482, Oct. 1950.

A case is reported of syphilitic reinfection of the so-called "ping-pong" variety, the first of its kind observed at the Manila Rapid Treatment Center. The husband acquired the disease after extramarital relationship and infected his wife before he received adequate treatment. The wife, without receiving the benefit of examination and treatment, reinfected the husband when he resumed marital relationship after intensive therapy. Both husband and wife responded favorably to treatment. Importance of examination and treatment of both partners in venereal disease cases is emphasized.

J. ROY. EGYPTIAN M. A., CAIRO

Egyptian Foreign Minister and WHO Regional Director sign agreement. Joint attacks on diseases to be carried out—VD demonstration at Tanta to start soon. J. Roy. Egyptian M. A., 33 : 850–851, No. 8–9, 1950.

An antivenereal disease demonstration project will be carried out in the city of Tanta for 2 years together with a training and teaching program in modern control methods of syphilis at the Kars El Aini Hospital in Cairo. It is expected that at least 300 blood tests will be made daily at both centers.

J. ROY. SAN. INST., LONDON

The prophylaxis of mental illness. E. W. Anderson. J. Roy. San. Inst., 71 : 153–158, 162–165, Mar. 1951.

In this paper on causes and prevention of mental illness, disorders due to alcoholism and syphilis are discussed. Author states there is no doubt that the decrease in incidence of general paralysis in recent years is due in large measure to the discovery of effective means for the treatment of syphilis in the early stages.

J. SOCIAL HYG., NEW YORK

City of sick children. A plea for united action against congenital syphilis. Betty Huse. J. Social Hyg., 37 : 64–69, Feb. 1951.

The problem of congenital syphilis in the United States is discussed. The combined action of physicians, nurses, public health workers, and social service agencies concerned with family life can help bring the disease under control through detection and immediate treatment.

World front against venereal disease. J. Social Hyg., 37 : 76–78, Feb. 1951.

Program and activities of the International Union Against The Venereal Diseases during 1950 are briefly reviewed.

New responsibilities in VD control. Dorian Paskowitz and Walter B. Quisenberry. J. Social Hyg., 37 : 79–83, Feb. 1951.

A report is presented on a study of 12 promiscuous women of varying ages, races, and educational levels, undertaken in 1949 by the Bureau of Venereal Diseases and Cancer Control of the Department of Health, Territory of Hawaii. The most important and practical conclusion drawn from the study was the awareness that venereal diseases and their spread are dependent mainly on sexual promiscuity which, in turn, is directly related to a disorder of personality.

### LANCET, LONDON

Bacterial polysaccharides in the diagnosis of infections. The polysaccharide lysis test. John C. Thomas and A. T. Mennie. Lancet, 2 : 745–746, Dec. 9, 1950.

The principle and use of polysaccharide lysis test in diagnosis of infections, including gonorrhea, are described. Six methods for preparing serologically active polysaccharide fractions are presented.

Treatment of early syphilis with penicillin, neoarsphenamine, and bismuth, and with penicillin and bismuth alone. F. J. G. Jefferiss, R. R. Willcox, and G. L. M. McElligott. Lancet, 1 : 83–85, Jan. 13, 1951.

Of 744 patients with early syphilis treated at St. Mary's Hospital in 1946–48, 561 received an 8-day course of penicillin, neoarsphenamine, and bismuth, while the remaining 183 received penicillin and bismuth only. Follow-up of 3 to 24 months or more revealed 13 known relapses. Authors are becoming convinced that, provided penicillin-resistant strains of treponemes do not appear, the end of the arsenical era is probably at hand, and that the best treatment of syphilis in the future will be effected without the aid of these drugs.

Penicillin in Weil's disease. A. I. Suchett-Kaye. Lancet, 1 : 90–92, Jan. 13, 1951.

Effective treatment of six cases of Weil's disease with penicillin is described. An interesting point noted in one of the cases was that a reaction, seen only a few hours after the administration of penicillin, clinically resembled the Jarisch-Herxheimer reaction occurring in primary and secondary syphilis. No description of such reactions in Weil's disease has previously been reported.

### M. PRESS, LONDON

The roots of venereal diseases. R. R. Willcox. M. Press, No 5824 : 595–600, Dec. 20, 1950.

The author discusses the problems of promiscuity, extramarital sex relations, continuance, and suppression of sex, and their relationship to the spread of venereal diseases.

Lesions of the vulva. William Hunter. M. Press, No. 5825 : 613–616, Dec. 27, 1950.

In this review on lesions of the vulva, diagnosis and treatment of gonorrhea, syphilis, and chancroid are discussed.

### MICHIGAN PUB. HEALTH, LANSING

Your responsibility in venereal disease control. John A. Cowan. Michigan Pub. Health, 39 : 8, Jan. 1951.

In this brief discussion of the incidence and control of venereal disease among Michigan's high school boys and girls, a list of recommendations to parents, teachers, and group advisers is presented.

### MINNESOTA MED., ST. PAUL

Luetic aortitis. Editorial. Minnesota Med., 33 : 1126–1127, Nov. 1950.

Presence of a linear-appearing calcification in the ascending aorta on the X-ray film is considered to be acceptable for a diagnosis of syphilitic aortitis until proved otherwise.

### NEW ENGLAND J. MED., BOSTON

Medicine as a social instrument : Preventive medicine. W. G. Smillie. New England J. Med., 244 : 329–333, Mar. 1, 1951.

History of preventive medicine is reviewed. Prevention and control of venereal diseases during the past 50 years are discussed.

Medicine as a science : Neurology. Henry R. Viets. New England J. Med., 244 : 400–407, Mar. 15, 1951.

History of neurology, based upon a review of the literature from 1901 to 1950, is presented. Progress in diagnosis and treatment of syphilis during the past half century is reviewed.

### NEW YORK MED., NEW YORK

Acquired arterial aneurysms. Jere W. Lord, Jr. New York Med., 7 : 16–17, Mar. 5, 1951.

Diagnosis, treatment, location, and causes of aneurysms are discussed. The most common etiologic causes of aneurysms of the thorax, the abdomen, and the extremities are arteriosclerosis and syphilis.

NORTH CAROLINA M. J., WINSTON-SALEM

Treatment of advanced strictures of the rectum due to lymphogranuloma venereum. H. Max Schiebel. North Carolina M. J., 12: 49–52, Feb. 1951.

During 10 years the author analyzed 139 patients with lymphogranuloma venereum at three hospitals in Durham. From a review of the literature and data gathered from observations, he concludes that dilatations are never curative. The firm, fibrous tissue strictures never disappear, and mucosa destroyed over large areas never regenerates. Abdominoperineal resection is a satisfactory method of treating the condition.

OHIO STATE M. J., COLUMBUS

Observations on 360 cases of primary syphilis (treated with penicillin alone or with penicillin plus Mapharsen and bismuth). Edward H. Jones, Jr. Ohio State M. J., 47: 131–133, Feb. 1951.

From a review of the literature and this study, the author concludes that, in general, the seronegative and low-titer (earlier) cases have a better chance of successful treatment than those with high titers (later); 1 week of penicillin therapy totaling up to 4,800,000 units is not enough for primary syphilis; penicillin plus Mapharsen and bismuth are somewhat more efficacious than penicillin alone.

POSTGRAD. MED., MINNEAPOLIS

Treatment of vaginitis and cervicitis by the general practitioner. Karl John Karnaky. Postgrad. Med., 9: 220–224, Mar. 1951.

A report is presented of the treatment of 317 patients with vaginitis (169 cases of trichomonas vaginitis, 139 of *Monilia albicans*, and 9 nonspecific) and 60 patients with cervicitis at the Jefferson Davis Hospital, Houston, Tex. Sulfathiazole acid jelly was used in the 317 cases of vaginitis, and results obtained compare favorably with similar preparations described in the literature.

PRACTITIONER, LONDON

Current therapeutics. XXXVI.—Modern penicillin therapy. Alexander Fleming. Practitioner, 165: 639–645, Dec. 1950.

The development of penicillin during the last 5 years is discussed. Dosage scheme and blood levels, measures for reducing the number of injections, procaine penicillin, prolongation of action, oral administration, and penicillin resistance are considered. Other antibiotics are mentioned briefly.

PUB. HEALTH, LONDON

Venereal disease control in the U. S. A. R. R. Willcox. Pub. Health, 64: 44–47, Jan. 1951.

This is the third of a series of articles dealing with venereal disease control in the United States. Incidence, case finding, contact tracing, mass blood testing, role of private physicans, case holding, and education programs are discussed. A review of the literature is presented.

PUB. HEALTH NURSING, NEW YORK

The health of Florida's Seminoles. Ruth E. Baker. Pub. Health Nursing, 42: 591–594, Nov. 1950.

Health and sanitation conditions among Seminole Indians in Florida are described. An epidemic of gonorrhea, during which 19 to 20 persons became infected, was reported in 1930. No cases of syphilis or gonorrhea are recorded as active today.

Venereal disease programs in European countries. Hazel Shortal. Pub. Health Nursing, 43: 91–93, Feb. 1951.

Impressions gained by the author on the venereal disease control programs in Sweden, Denmark, Switzerland, Italy, France, and England are discussed.

PUB. HEALTH REP., WASHINGTON

Résumé of Public Health Service grant-in-aid programs providing medical services. Estella Ford Warner and Evelyn Flook. Pub. Health Rep., 66: 167–182, Feb. 9, 1951.

In this résumé, mention is made of the grant-in-aid program as pertains to venereal disease. All State health agencies utilize Federal grants for venereal disease programs. Direct case-finding program, including development of new and improved case-finding technics, development and dissemination of mediums for professional and public education, and development and evaluation of time-dose schedules of therapy utilizing penicillin and other antibiotics are some of the services furnished directly to States by the Public Health Service.

Negro mortality. IV. Urban and rural mortality from selected causes in the North and South. Maryland Y. Pennell and Mary Gover. Pub. Health Rep., 66: 295–305, Mar. 9, 1951.

Death rates from selected causes, including syphilis, among nonwhite and white persons in 1940 are presented for three population-size groups in northern and southern regions of the eastern and central United States.

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### QUART. BULL., DEPT. OF HEALTH, NEW YORK, NEW YORK

Revised schedules for syphilis therapy. Quart. Bull., Dept. of Health, New York, 18: 61, Winter 1950–51.

New York City Department of Health has discontinued distribution and routine use of arsenicals and bismuth in treatment of syphilis. Penicillin dosage schedules for the various types of syphilis are presented.

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### QUART. BULL., NORTHWESTERN UNIV. M. SCHOOL, CHICAGO

Historical notes on the Twelfth General Hospital (U. S.). XVI. The transfusion service. Hugh Wilson. Quart. Bull., Northwestern Univ. M. School, 24: 221–224, Fall 1950.

The author discusses the lessons emphasized by large-scale dispensing of blood in an overseas military installation. The exclusion of syphilis in donors cannot be done with complete assurance, inquiry as to venereal disease and a routine Kahn being the only practical measures. In 3,690 bloods drawn for transfusion purposes, 16 positive serologies were encountered. A safeguard against transmission of viable spirochetes is offered by refrigeration.

### REV. GASTROENTEROL., NEW YORK

Intestinal symptoms in nongastrointestinal lesions. Bernard J. Ficarra. Rev. Gastroenterol., 18: 131–134, Feb. 1951.

Cerebral syphilis and tabes dorsalis are listed among pathologic conditions which, though not directly associated with the gastrointestinal tract, often cause the intestinal symptoms of nausea and vomiting.

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### SOUTH. M. J., BIRMINGHAM

Prophylaxis of gonorrheal ophthalmia. Editorial. South. M. J., 44: 168, Feb. 1951.

The writer states that although the use of silver nitrate has eliminated one of the greatest causes of blindness of children, there are other materials which could be used if the State laws permitted their substitution.

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### WEST. J. SURG., PORTLAND

Vulvovaginal (Bartholin) cyst. Treatment by marsupialization. Philip Jacobson. West. J. Surg., 58: 704–708, Dec. 1950.

The importance of conservation of the vulvovaginal glands of Bartholin is stressed, and the anatomy, physiology, pathology, and treatment are discussed. Infection due to the gonococcus is considered in the pathology.

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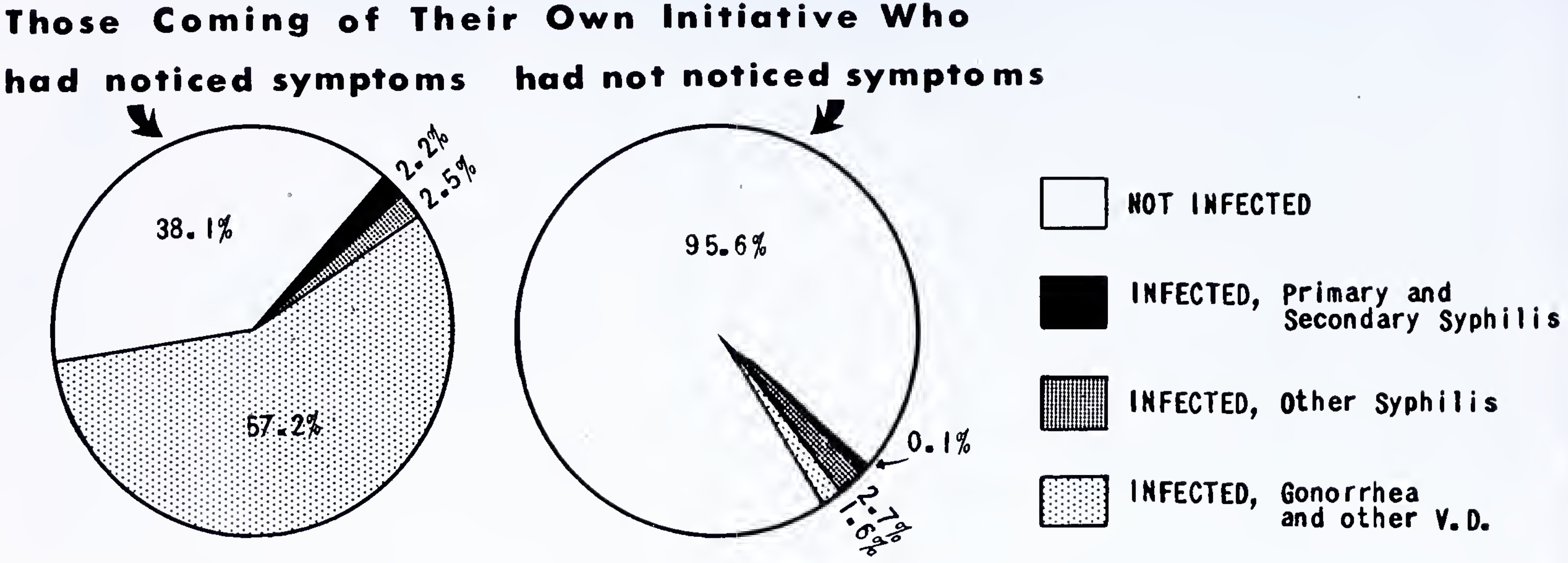
### WEST VIRGINIA M. J., CHARLESTON

The economic need for an adequate public health program in West Virginia. B. M. Drake. West Virginia M. J., 47: 78–81, Mar. 1951.

The State health program is discussed as to costs and the prevention of disease and death due to preventable disease, which results in an enormous economic loss to the State as well as a loss of valuable lives. A table is presented showing that the economic loss from seven causes of death listed amounted to over $18,000,000 in 1949. The estimated economic loss due to 35 deaths caused by syphilis was $442,000.

# PERSONS COMING TO VENEREAL DISEASE CLINICS FOR DIAGNOSIS



*Based on reports from Arkansas, Chicago, Colorado, District of Columbia, Iowa, Kansas, Kentucky, Louisiana, Maryland, Michigan, Nebraska, New Mexico, New York City, Oklahoma, St. Louis, Texas, and West Virginia for the 1950 fiscal period.

Source: PHS Form 8954-A FSA-PHS Division of Venereal Disease, Office of Statistics 4/20/51 (EJD-HWM)mw

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# The JOURNAL of VENEREAL DISEASE INFORMATION

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In order to facilitate the handling of manuscripts submitted for publication in THE JOURNAL OF VENEREAL DISEASE INFORMATION, the editor requests that copy be prepared in triplicate, typewritten, double-spaced, with liberal margins. Statistical tables and charts should be set up according to the style used in the JOURNAL, and should be presented on separate sheets, rather than within text material.

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# Intramuscular Injections of Chloromycetin in the Treatment of Granuloma Inguinale[1]

**Fred W. Harb, M. D.;[2] Willie G. Simpson, M. D.;[3] and Clayton E. Wood, M. D.[4]**

Until the advent of the antibiotics, granuloma inguinale was treated, with varying degrees of success, with such antimonial preparations as tartar emetic, diramin, Fuadin, and Anthiomaline. The long treatment period, poor therapeutic results, and high recurrence rates in granuloma inguinale patients so treated produced severe case-holding problems.

Streptomycin was the first of the antibiotics to be considered as a therapeutic agent for granuloma inguinale. In 1947, it was reported to be highly effective in total dosage of 20 gm. administered at the rate of 4 gm. per day over a 5-day period (*1*). Relapses, streptomycin-resistant strains, and occasional untoward reactions have been reported (*1, 2, 3, 4*).

In 1948, aureomycin was introduced in both parenteral and oral forms (*3*). The recent reports on aureomycin therapy (*5, 6*) deal largely with oral administration. Considerable nausea and rather severe vomiting are produced by the oral preparation in therapeutic dosage, making it quite difficult to determine accurately the amount of drug ingested by the patient, and occasionally necessitating discontinuation of therapy.

More recently, oral Chloromycetin has been reported to be effective in the treatment of granuloma inguinale (*4, 7, 8*). Although in vitro studies (*9*) suggested that this preparation was not as effective as streptomycin and aureomycin, the Donovan body was reported to disappear by the third day with rapid healing of lesions (*8*). Chloromycetin presents an advantage over aureomycin in that it does not produce nausea and vomiting when therapeutic dosages are used.

Past experience with oral medication has shown clearly that patients cannot be relied upon to take medication as ordered. It seems apparent that outpatient treatment procedures require the use of a preparation permitting parenteral administration. With this in mind, efforts were directed toward the development of a Chloromycetin preparation which could be injected intramuscularly.

## Preparation of Parenteral Chloromycetin

Finely ground Chloromycetin powder was suspended in graded amounts of sterile normal saline solution until the resultant suspension contained 500 mg. of Chloromycetin per cubic centimeter of suspension. The final product has a consistency not unlike that of repository penicillin. When transferred to a sterile rubber-stoppered vial and tested for sterility, it is ready for use.

This Chloromycetin suspension, when injected into a rabbit, produced no obvious local irritation and, on gross examination of the injected muscle, apparently had produced no more reaction than was noted with repository penicillin preparations. Actually, it was difficult to find the area of tissue injected.

A single intramuscular injection of 2 gm. of this Chloromycetin suspension gave measurable serum levels for 24 hours, and urinary excretion levels for 72 hours. A 4-gm. injection consistently maintained serum levels for 72 to 96 hours.

Encouraged by the preliminary studies using the Chloromycetin suspension, a study was started using this preparation in the treatment of venereal disease.

## Clinical Material

Sixty-nine patients have been treated with this material. Forty-three were treated for granuloma inguinale; 24, for early infectious syphilis; and 2, for gonorrhea. This report deals only with the 43 granuloma inguinale patients, 15 of whom were treated at Alto Medical Center, Alto, Ga., and 28 of whom were treated at the Eastern Medical Center, Durham, N. C. The results of treating these two groups of patients are shown in tables 1 and 2.

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[1] From the U. S. Public Health Service.

[2] Senior Surgeon, Medical Officer in Charge, Eastern Medical Center, Durham, N. C.

[3] Senior Surgeon, Medical Officer in Charge, Alto Medical Center, Alto, Ga.

[4] Senior Assistant Surgeon (R), Alto Medical Center, Alto, Ga.

All of the 43 cases of granuloma inguinale were proved by the demonstration of *Donovania granulomatis* in Wright's stained-tissue scrapings. All of these cases occurred in Negroes, of whom 23 were females and 20 were males. The duration of infection varied considerably, from 1 week to 9 years. The extent of tissue involvement varied from small solitary granulomatous areas to multiple extensive areas of tissue involvement. In only 7 cases could a history of prior treatment be obtained.

### Dosage Used

Initially, the treatment schedule was set at a single injection of 2 gm. (4 cc. of suspension) intramuscularly every 96 hours for three injections, a total of 6 gm. in 8 days. This schedule was increased to 4 gm. every 72 hours at Durham, after two patients, treated with the previous schedule, relapsed. At Alto, a schedule of 4 gm. of suspension every 96 hours was used from the start and retained throughout the study period. Unavoidable variations from the routine treatment schedule occurred because of a shortage in supply of Chloromycetin preparation at Alto. At Durham, case 3 was given a fourth injection because of persistence of Donovan bodies in tissue scrapings through the eighth day. Case 14 was sent to another hospital for delivery, thus interrupting her treatment schedule. Case 23, treated as an outpatient, failed to return on the sixth day for his scheduled injection, causing his treatment to be prolonged through the ninth day. Each of three patients at Alto received only a single injection of 4 gm., while each of two other patients received a total of 8 gm. of suspension. We are watching these patients with interest since the response of these individuals, to date, is as remarkable as the response of patients who received the full 12 gm. of Chloromycetin.

### Toxicity and Reactions

There was no demonstrable local reaction or irritation at the site of injection in any of the 52 patients who received this Chloromycetin preparation at Durham. The patients who, in the past, had received repository penicillin stated that injections of Chloromycetin produced no more local discomfort than injections of penicillin.

In the Alto group, patient 14 complained of tenderness at the site of injection, but at no time during the 18 days of observation was heat or swelling detected. The patient received procaine penicillin along with the Chloromycetin. When the follow-up examination was performed 3 months later, the patient showed a healed, scarred area at the injection site and gave a history suggesting gluteal abscess. It seems likely that this occurrence was caused by faulty sterile technic rather than by toxicity of the preparation used.

No evidence was noted of nausea, vomiting, pharyngitis, eruption, or other untoward systemic reactions in any of the patients treated, with the possible exception of case 14 mentioned above. Temperatures remained normal throughout the period of hospitalization in all cases treated at Durham, except for occasional single temperature elevations to 100.6° F.

### Results

Healing of lesions was uniformly rapid in all cases treated, with complete healing of 20 of the 43 cases within 10 days of the first injection. Only 3 patients failed to progress to complete healing by the twenty-first day. Donovan bodies disappeared from tissue scrapings in 48 hours or less in 21 of the 43 cases treated. In only 3 cases were Donovan bodies present beyond 96 hours after the first

## Table 1.—*Results of intramuscular injections of Chloromycetin suspension in treatment of granuloma inguinale (Alto Medical Center)*

| Case No. | Age (years) | Race | Sex | Duration (months) | Severity | Previous treatment | Day of injection: 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | Disappearance time of Donovan bodies (hours) [1] | Time required for complete healing (days) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Amount of suspension (gm.) | | | | | | | | | | | | | |
| 1 | 22 | N | F | 12 | Extensive | None | 4 | | | | 4 | | | | 4 | | | | 24 | 11 |
| 2 | 35 | N | F | 48 | do | do | 4 | | | | 4 | | | | 4 | | | | 72 | 16 |
| 3 | 38 | N | F | (2) | Slight | do | 4 | | | | | | | | 4 | | | 4 | 24 | 14 |
| 4 | 52 | N | F | (2) | Moderate | do | 4 | | | | | | 4 | | | | 4 | | 24 | 11 |
| 5 | 19 | N | F | 24 | do | do | 4 | | | | 4 | | | | 4 | | | | 24 | 12 |
| 6 | 21 | N | M | 4 | Slight | do | 4 | | | | | | | | | | | | 24 | 7 |
| 7 | 20 | N | F | 2 | do | do | 4 | | | | | | | | | | | | 48 | 8 |
| 8 | 17 | N | F | 1+ | Moderate | do | 4 | | | | | | | | | | | | 24 | 8 |
| 9 | 37 | N | F | 2 | Slight | 1948 | 4 | | | | 4 | | | | 4 | | | | 24 | 9 |
| 10 | 35 | N | F | 6 | Moderate | None | 4 | | | | 4 | | | | 4 | | | | 24 | 9 |
| 11 | 18 | N | F | 3 | do | do | 4 | | | | 4 | | | | | | | | 48 | 9 |
| 12 | 19 | N | F | 1+ | Slight | do | 4 | | | | 4 | | | | | | | | 24 | 8 |
| 13 | 25 | N | M | 6 | Extensive | do | 4 | | | | 4 | | | | 4 | | | | 24 | 9 |
| 14 | 26 | N | F | 12 | Moderate | do | 4 | | | | 4 | | | | 4 | | | | 72 | 8 |
| 15 | 35 | N | M | *Years*<br>9 | Extensive | 1941-45 | 4 | | | | 4 | | | | 4 | | | | 24 | 17 |

[1] All patients remained healed from end of treatment to the present time, except patient 14, who relapsed after 3 months and was re-treated with streptomycin.
[2] Unknown.

Table 2.—*Results of intramuscular injections of Chloromycetin suspension in treatment of granuloma inguinale (Durham, N. C.)*

| Case No. | Age (years) | Race | Sex | Duration | Severity | Previous treatment | Day of injection |  |  |  |  |  |  |  |  |  |  |  |  | Disappearance time of Donovan bodies (hours) | Time required for complete healing (days) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  |  |  |  |  |  | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |  |  |
|  |  |  |  |  |  |  | Amount of suspension (gm.) |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 1 | 22 | N | M | *Weeks*<br>1 | Slight | None | 4 |  |  | 4 |  |  | 4 |  |  |  |  |  |  | Not done | 10 |
| 2 | 20 | N | M | 1+ | do | do | 4 |  |  | 4 |  |  | 4 |  |  |  |  |  |  | 96 | 15 |
| 3 | 57 | N | M | *Months*<br>48 | Extensive | 1946 | 4 |  |  | 4 |  |  | 4 |  |  | 4 |  |  |  | 192 | 30 |
| 4 | 39 | N | M | 24+ | Moderate | None | 4 |  |  |  | 4 |  | 4 |  |  |  |  |  |  | 144 | 14 |
| 5 | 22 | N | F | *Weeks*<br>1+ | Slight | do | 4 |  |  | 4 |  |  | 4 |  |  |  |  |  |  | 72 | 8 |
| 6 | 36 | N | F | *Months*<br>48 | Extensive | do | 4 |  |  | 4 |  |  | 4 |  |  |  |  |  |  | 96 | 21 |
| 7 | 25 | N | F | 12 | do | do | 4 |  |  | 4 |  |  | 4 |  |  |  |  |  |  | 48 | 15 |
| 8 | 33 | N | M | 48 | Moderate | 1946-48 | 4 |  |  | 4 |  |  | 4 |  |  |  |  |  |  | 96 | 20 |
| 9 | 25 | N | F | *Weeks*<br>1+ | do | None | 4 |  |  | 4 |  |  | 4 |  |  |  |  |  |  | 96 | 13 |
| 10 | 22 | N | F | *Months*<br>1 | Extensive | do | 4 |  |  | 4 |  |  | 4 |  |  |  |  |  |  | 96 | 15 |
| 11 | 22 | N | M | *Days*<br>6 | Slight | do | 4 |  |  | 4 |  |  | 4 |  |  |  |  |  |  | 24 | 10 |
| 12 | 29 | N | F | *Months*<br>24 | Extensive | do | 4 |  |  | 4 |  |  | 4 |  |  |  |  |  |  | 72 | 14 |
| 13 | 28 | N | M | 4 | Slight | do | 4 |  |  | 4 |  |  | 4 |  |  |  |  |  |  | 48 | 10 |
| 14 | 24 | N | F | 9 | Extensive | do | 4 |  |  |  |  |  |  |  |  | 4 |  |  | 4 | 72 | 15 |
| 15 | 21 | N | F | 4 | Slight | do | 4 |  |  | 4 |  |  | 4 |  |  |  |  |  |  | 96 | 9 |
| 16 | 31 | N | M | 1 | Moderate | 1948 | 4 |  |  | 4 |  |  | 4 |  |  |  |  |  |  | 48 | 17 |
| 17 | 37 | N | M | 6-12 | Slight | None | 4 |  |  | 4 |  |  | 4 |  |  |  |  |  |  | 48 | 15 |
| 18 | 40 | N | F | 6 | Extensive | do | 2 |  |  |  | 2 |  |  |  | 2 |  |  |  |  | 72 | 25 |
| 19 | 64 | N | M | 60 | Slight | do | 4 |  |  |  |  |  | 4 |  |  |  |  |  |  | Not done | 10 |
| 20 | 18 | N | M | *Weeks*<br>6 | do | do | 4 |  |  |  | 4 |  |  |  |  |  |  |  |  | 24 | 10 |
| 21 | 24 | N | M | *Months*<br>60 | Moderate | 1945 | 4 |  |  |  | 4 |  |  |  | 4 |  |  |  |  | 48 | 9 |
| 22 | 28 | N | M | 2 | Slight | None | 4 |  |  |  | 4 |  |  |  | 4 |  |  |  |  | 168 | 17 |

| | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 23 | 38 | N | M | 6 | Moderate | do | 4 | | | 4 | | | | | | | | | | 72 | 10 |
| | | | | 3 | Slight | 8 gm. CS [1] | 4 | | | | 4 | | | | 4 | | | | | 48 | 10 |
| 24 | 26 | N | F | 24 | Extensive | 1948 | 4 | | | | 4 | | | | 4 | | | | | 48 | 21 |
| 25 | 18 | N | F | *Weeks* 2 | Slight | None | 4 | | | 4 | | | 4 | | | | | | | 48 | 8 |
| 26 | 22 | N | M | *Months* 1 | Moderate | do | 2 | | | | 2 | | | | 2 | | | | | 96 | [2] 10 |
| | | | | 3 | Slight | 6 gm. CS [1] | 4 | | | 4 | | | 4 | | | | | | | 72 | 8 |
| 27 | 28 | N | M | 24 | Extensive | 1947 | 2 | | | | 2 | | | | 2 | | | | | Not done | [3] 10 |
| | | | | *Days* 11 | Slight | 6 gm. CS [1] | 15 gm. streptomycin | | | | | | | | | | | | | (4) | 5 |
| 28 | 24 | N | M | *Months* 4 | Moderate | None | 4 | | | 4 | | | 4 | | | | | | | 96 | [5] 9 |
| | | | | 2 | Slight | 12 gm. CS [1] | 4 | | | 4 | | | 4 | | | 4 | | | 4 | [6] Not done | 15 |

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[1] Chloromycetin suspension.
[2] 95-percent healing; Donovan bodies positive 2 months later; never completely healed.
[3] Recurrence 2 days later.
[4] Donovan bodies negative initially.
[5] Relapsed 3 weeks later.
[6] Only extracellular Donovan bodies present.

injection was received. Of the 43 cases of granuloma inguinale treated with Chloromycetin suspension, 5 have relapsed to date. Two of the relapsed cases were re-treated with streptomycin; the other three healed promptly and have remained healed after a second course of Chloromycetin. There was no evidence of resistance to Chloromycetin in the re-treated group. Case 26 of the Durham group failed to obtain complete healing and by the second month posttreatment Donovan bodies were demonstrable in tissue scrapings. The patient responded promptly to a second course of treatment with a total dose of 12 gm. of Chloromycetin suspension and has remained healed for 6 months. Case 27 healed completely by the tenth day. On the twelfth day there was a small area of breakdown in existing scar tissue. Although Donovan body preparations were repeatedly negative, this patient was re-treated with streptomycin with prompt healing. Both case 26 and case 27 received a total dose of only 6 gm. of Chloromycetin. Case 23 and case 28 of the Durham group, initially treated with 12 gm., failed on the eighth and third week, respectively. Case 23 showed recurrence of lesions in the sixth week, and positive Donovan bodies were demonstrable by the eighth week. Only extracellular bodies were found in case 28.

Only one patient in the Alto group suffered relapse. This was case 14, who had recurrent lesions at the time of the third monthly check-up, and positive Donovan bodies were demonstrated.

### Discussion

Chloromycetin suspension in saline solution, if injected intramuscularly in adequate dosage, is apparently an extremely effective preparation in the treatment of granuloma inguinale. The treatment in this series routinely required only one to three injections given during a 6- to 8-day period of time. The actual amount of drug received by the patient is known and the responsibility for administration is retained by the physician. The lack of any untoward systemic or marked local reaction associated with the use of this preparation in patients in this series would suggest that Chloromycetin in this form is relatively safe to use. The simplicity of the treatment schedule lends itself well to office out-patient use. It is our opinion, as well as that of the staff physicians who have watched the patients in this series, that intramuscular injection of Chloromycetin is far more rapid and effective in the treatment of granuloma inguinale than other antibiotics we have used (at Alto Medical Center), such as streptomycin, oral Chloromycetin, and intravenously injected aureomycin. The dosage of Chloromycetin used in this series is an arbitrary one, and increasing the amount of the individual dose or the number of injections may well represent a more optimal schedule. The recurrence rate, however, with the dosage used, is not in excess of that seen in the use of the other antibiotics. The fact that Chloromycetin suspension has produced such rapid and spectacular clinical results in the 43 cases of granuloma inguinale treated, and its apparent innocuousness in this clinical trial, warrant additional clinical study using this material in the treatment of granuloma inguinale as well as in other venereal diseases. (Its use in the treatment of early infectious syphilis, to be reported soon, has been extremely encouraging in promoting rapid healing of lesions and seroreversal over short follow-up periods.) No evidence of resistance to Chloromycetin was noticed in a single case in the relapses re-treated with Chloromycetin. The patients who relapsed either went on to incomplete healing by the twenty-first day or had recurrent breakdown within the healed area by the third month, suggesting, perhaps, that the optimal dosage of drug had not been reached.

### Summary

1. A method of treating granuloma inguinale by intramuscular injections of Chloromycetin has been described.

2. Thirty-eight cases of granuloma inguinale responded favorably to this

treatment and remained healed over a 2- to 11-month follow-up period. Two of the five patients who relapsed were treated initially on a reduced schedule, with only 6 gm. of Chloromycetin used in the total dosage.

3. No systemic or marked local reaction attributed to the use of Chloromycetin has been demonstrable.

4. Parenteral Chloromycetin, due to the simplicity of treatment schedule, would appear to be applicable for out-patient use.

5. No evidence of resistance to Chloromycetin was noticed in the patients who were re-treated.

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# Blindness Due to Syphilis[1]

**Joseph V. Klauder, M. D.**[2]

Hurlin's (*1*) estimate of the rate of blindness per 1,000 population is 1.75, which would indicate that there are about 262,000 blind persons in the United States. This figure includes persons with visual acuity varying from no perception of light, which is the ophthalmologist's conception of blindness, to 6/60 (20/200), which defines the upper limit for industrial blindness.

## Role of Syphilis

Statistical studies of the causes of blindness attribute 10 to 15 percent to syphilis (*2–5*). We would estimate that at least 90 percent of blindness caused by syphilis can be attributed to optic atrophy of both acquired and congenital syphilis. Ten to fifteen percent of all patients with tabes of acquired syphilis and 50 percent of all patients with tabes

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[1] Read at the Venereal Disease Control Seminar held in Phoenix, Ariz., November 15–16, 1950.

[2] From the Clinic for Treatment of Ocular Syphilis, Wills Hospital, and the Division of Venereal Disease Control, Department of Public Health of Philadelphia.

Note: The work described in this paper was done under a contract recommended by the Committee on Medical Research, between the Office of Scientific Research and Development and the Wills Hospital, and later under a grant-in-aid from the Research Grants and Fellowship Division, National Institutes of Health, U. S. Public Health Service.

and paresis of congenital syphilis ultimately develop optic atrophy.

Optic atrophy and interstitial keratitis approach cataract and glaucoma in importance as causes of blindness (*6*) and merit as much attention as now is being given to glaucoma and to publicity in industry for the use of goggles to prevent injury to the eye.

## Primary Optic Atrophy

We studied 397 patients who had primary optic atrophy. Twenty of these had congenital syphilis; in the remainder the infection was acquired.

Of the 377 patients with acquired syphilis the majority were white males (57 percent). There were slightly more Negro females (19 percent) than either white females (14 percent) or Negro males (10 percent). Of the 20 patients with congenital syphilis, 14 were females and 6 were males. The younger patients of the acquired syphilis group when first seen ranged in age from the late twenties to early thirties. At these ages congenital syphilis should be suspected since optic atrophy of the congenital syphilis group appeared in the mid- or late twenties and early thirties. The predominating age range of the acquired-syphilis group was from 40 to 50.

Outstanding in our study was the large percentage of patients who had no knowledge of infection, had had no treatment and no serologic tests. If previous treatment had been given, it was grossly inadequate. Of patients who had knowledge of infection there was an average interval of 18 years between infection and onset of loss of vision. The minimum interval we observed was 10 years. There was an average of 18 months between onset of loss of vision and institution of what might be regarded as proper treatment of optic atrophy.

An important observation was that almost one-third of our patients at onset of impaired visual acuity consulted an optometrist as an initial means of treatment. Some visited the same or a different optometrist for as long as 2 years. On admission to the clinic 17 percent of our 397 patients had light perception or less, and 44 percent had visual acuity of 1/60 to 6/60. In other words, 61 percent of our patients when first seen were either essentially blind or industrially blind. This represents an unfortunate experience in early diagnosis of syphilitic optic atrophy among the ward and clinic patients at Wills Hospital.

### *Symptoms of Optic Atrophy*

Frequently, impaired visual acuity was the first and only symptom that motivated the patient to seek medical attention. When first seen, the duration of impaired visual acuity of the untreated series varied from a few weeks to months or years. The patient suddenly becomes cognizant of impaired vision. A typical comment was: "My eyes were good until 6 months ago—all at once when I was cutting pipe my boss told me I was cutting it crooked."

The degree of visual loss and advancement of optic atrophy existing before the patient becomes aware of impaired vision may be considerable. It is surprising how much impairment of central vision or constriction of peripheral vision may exist before the patient is compelled to stop work. One patient was still working as a general laborer when he came to the clinic. The visual acuity in the right eye was 2/60, in the left, 6/60.

The majority (64 percent) of our patients had the tabetic form of neurosyphilis, but other forms—meningovascular, taboparesis, and paresis—were represented. We believe too much emphasis has been placed on the association of optic atrophy with the tabetic form of neurosyphilis. Optic atrophy should be visualized as a single phase of neurosyphilis regardless of the clinical form.

In a considerable percentage of patients the underlying neurosyphilis pursued, so far as concerned subjective symptoms, a silent course. This disease is rarely seen in a patient who has what is called "leg" tabes in which the triad of tabetic symptoms—lightning pains, dysuria, and ataxia—are present.

### *Prodromal and Early Symptoms*

In addition to impaired vision the following subjective symptoms were most frequently observed:

*Pain in the legs.*—This predominated (62 percent) in the tabetic patient but was also present in the patient with meningovascular neurosyphilis (16 percent). It was stabbing, lancinating, occurring and recurring in "crisis." The pain was usually not incapacitating or sleep disturbing and in many cases was discovered only by questioning the patient.

*A history of diplopia* was obtained in 33 percent of the tabetic patients and in 12.5 percent of patients with meningovascular neurosyphilis. It was usually transitory and invariably preceded, frequently by years, complaint of visual loss. Rarely was diplopia present at the time the patient was first seen.

*Loss of dark adaptation to light.*—This is an early symptom of optic atrophy. In consideration of difficulty in its determination, we do not regard it as a practical procedure in early diagnosis.

*Difficulty in distinguishing colors.*—This likewise is an early symptom of optic atrophy. Its determination is time consuming and the results are not too reliable with the average clinic patient. It is not a practical nor a too accurate means of early diagnosis.

### *Early Diagnosis*

A high degree of awareness of optic atrophy is to be emphasized in examination of every patient who has clinical or serologic evidence of neurosyphilis.

The most constant findings in our patients were positive serologic tests for syphilis, positive spinal fluid (in some patients, however, the spinal fluid was negative), and pupillary abnormalities—inequality, irregularity, sluggishness in reaction to light, Argyll-Robertson pupil, or fixed to light and to accommodation. Pupillary abnormalities are one of the earliest and most constant signs of neurosyphilis, preceding by years the appearance of subjective symptoms. They constitute a "short cut" in clinical examination to diagnosis of neurosyphilis. Determinations of the state of the pupils are of great importance in examination of a syphilitic patient beyond the early stage of infection and should aid in early diagnosis of optic atrophy.

Ophthalmologic examination should be conducted on every patient who has neurosyphilis when first seen regardless of previous treatment or negative spinal fluid. Such examination facilitates early diagnosis in the following stages:

*Preatrophic stage.*—Bruetsch (7) observed that the earliest evidence of optic nerve involvement is an inflammatory process in the margin of the intracranial portion of the nerve or in the chiasm. Such process is dependent on a varying degree of syphilitic basilar meningitis. As the inflammatory process becomes extensive, demyelination (atrophy) of the nerve ensues.

A clinical correlation of the inflammatory stage preceding atrophy of the nerve is a perimetric field defect—central or paracentral scotoma, enlargement of the blind spot (determined on tangent screen), or some degree of contraction of the peripheral field of vision for form and color. In this stage there is no pallor of the optic disc, and visual acuity is not affected unless a central scotoma is present.

Among patients with neurosyphilis who had only perimetric field defects, treatment with penicillin with or without fever caused disappearance of such defects. In some patients chemotherapy alone did not achieve this result. Such defects do not disappear if the optic disc shows abnormal pallor evidencing atrophic stage of the disease.

There is evidence that at least in some patients the inflammatory or preatrophic stage of optic nerve involvement may precede by years the occurrence of atrophy or the atrophic stage of the disease. In order to diagnose in the preatrophic stage it is necessary to "reach out" for diagnosis by routine perimetric field studies (central or tangent screen and peripheral field). Determination of visual acuity and ophthalmoscopic examination of the optic disc do not suffice since these examinations are negative.

The problem of syphilitic optic atrophy in causing blindness does not concern entirely a lack of therapeutic response in the atrophic stage but, rather, is related to early diagnosis.

*Atrophic stage.*—Clinically this is evidenced by some degree of pallor of the optic disc or complete loss of its normal color, in which event it is chalky white. In this stage the patient has some degree of loss of visual acuity and presents visual field defects as shown by central and peripheral field studies.

Early diagnosis in this stage may be attained before the disease causes subjective loss of vision or becomes advanced. The amount of reduction of vision present before the patient becomes cognizant of it is related to intelligence, whether loss of central vision is early or late, greater involvement of one eye, degree of constriction of visual fields, and the nature of the patient's occupation.

In the early stage of optic atrophy no exact correlation can be made between degree of visual loss and degree of pallor of the disc, or between these two symptoms and visual-field defect.

It requires no clinical acumen to diagnose optic atrophy in a patient with neurosyphilis who complains of visual loss, has pale optic discs, and has visual-field defects. So far as a rapid course to blindness is concerned, a diagnosis at this stage is somewhat comparable to the diagnosis of malignant disease from cachexia.

*Visual-field defects.*—Four separate types of field defects are observed (*8*): (*a*) concentric contraction of the visual fields associated with late loss of central vision (about 12 percent of cases); (*b*) sector-shaped defect in which loss of vision may be early or late (about 34 percent); (*c*) central or cecocentral scotomas with normal peripheral fields, associated with early loss of vision (about 14 percent); (*d*) central or cecocentral scotomas with defects in the peripheral fields, associated with early loss of vision (about 40 percent).

Presence of scotomas (central, paracentral, and cecocentral) and enlargement of blind spot are determined on the tangent screen. For routine study a 3-mm. size white test object at 1,000 mm. (1 m.) is usually employed. This is designated as 3/1,000 white. A peripheral field determines the degree of contraction for form (white test object) and also for color—red, green, blue, and yellow. For practical purposes a white test object of 3-mm. size at 330 mm. (⅓ m.) may be employed. This is designated as 3/330 white. A peripheral field defect should be confirmed by repeated examinations. This also applied to further contraction of the visual fields before conclusion is made of unfavorable progress to exclude what may be regarded as normal variation in field defects observed in examinations at different times. It is desirable that consecutive perimetric studies be made by the same operator employing the same size test object, which facilitates comparison of a series of visual fields.

### Treatment

Our scheme of treatment comprises fever therapy (about 50 hours of fever over 100° F.) produced by malaria rather than vaccines intravenously. Unfortunately, in a considerable percentage of our patients, fever therapy is contraindicated because of physical condition. Penicillin is initiated during fever therapy. A total of 11,000,000 units is administered in 14 to 16 days. If the patient is hospitalized for fever therapy, aqueous penicillin with injections every 3 hours, or daily injections of penicillin in an oil base are employed. The latter is used if fever is contraindicated and the patient is treated on an ambulatory basis.

Following this therapy, visual acuity and visual fields (usually only a peripheral field) are determined every 3 months. At evidence of unfavorable progress—reduction in visual acuity with further contraction of the visual field—re-treatment with 11,000,000 units of penicillin is given and continuous treatment with metal chemotherapy is initiated. Visual-acuity and visual-field determinations are continued at 3-month intervals.

*Results of treatment.*—To date 80 patients have been treated in accordance with the foregoing plan with the following exceptions: At onset of study (April 1944) 4,200,000 units of penicillin were administered in 7½ days; in 1946 the amount was increased to 6,000,000 units given in the same period of time; and in 1948 a schedule of 11,000,000 units given in 14 to 16 days was initiated.

It was not possible to employ fever in treatment of all of the 80 patients. The majority had no treatment prior to penicillin and their optic atrophy at time of penicillin treatment was progressive. At onset of treatment 42 patients were industrially blind—visual acuity of 6/60 (20/200) to 1/60 (3/200).

The results of treatment are shown in table 1. Of the patients who became worse and of those who became blind, all but a few were re-treated with penicillin, fever (typhoid vaccine), and chemotherapy. Some received as many as four different courses of penicillin. Almost all of these two groups were industrially blind at onset of initial treatment with penicillin.

We regard these results as gratifying in consideration of the fact that about one-half of our patients with optic atrophy were industrially blind at onset of treatment.

**Table 1.**—***Results of treatment of 80 patients with optic atrophy due to syphilis***

| Number of patients | Period of observation (months) | Result |
|---|---|---|
| 15 | 60–78 | No change. |
| 14 | 36–59 | Do. |
| 11 | 24–35 | Do. |
| 8 | 12–23 | Do. |
| 2 | Died | Do. |
| Total 50 | | |
| 5 | 60–70 | Worse. |
| 3 | 33–40 | Do. |
| 7 | 4–32 | Do. |
| Total 15 | | |
| 5 | 16–30 | Blind (no vision, having light perception, able to count fingers, can see hand movements). |
| 10 | 3–15 | |
| Total 15 | | |
| Grand total 80 | | |

We advise the following modification of our plan of treatment. If the history evidences a rapid progress of the optic atrophy when first seen and there is considerable reduction of vision or contraction of the visual field, in addition to penicillin and fever therapy, continuous metal chemotherapy should be instituted. Penicillin re-treatment should be administered every 6 months. If no unfavorable progress has occurred within the ensuing year, chemotherapy could be made less continuous and a longer interval instituted between re-treatment with penicillin.

The first year after onset of treatment we regard as a crucial period in relation to whether the optic atrophy will remain stationary (no unfavorable progress) or will become worse (unfavorable progress). If the disease has remained unchanged for 3 years the chances of it remaining unchanged are considerably enhanced and become excellent at about the fifth-year period. We agree with Moore (*9*) who concluded from his studies that if the patient is not blind within 3 years of onset of optic atrophy, the prognosis is good.

As previously mentioned, no improvement of visual acuity or improvement of visual field defects occurs following treatment in the atrophic stage of the disease. The aim of treatment is to conserve what visual acuity the patient has and to arrest unfavorable progress of the disease.

Commenting on results of penicillin in treatment of neurosyphilis, Stokes aptly remarked, "so little accomplished so much and so much accomplished so little." This pertinently applies to treatment of optic atrophy. Our studies have shown that a single course of penicillin with or without fever therapy prevented unfavorable progress of optic atrophy, whereas repeated treatment failed in some cases to prevent a downhill course of the disease. We therefore doubt if the modification of our scheme of treatment will, in all cases, check unfavorable progress of optic atrophy.

It was observed that pain in the legs was improved in variable degree in the majority of patients; complete disappearance was exceptional. In a few patients, although the optic atrophy remained unchanged, new symptoms such as ataxia and impaired sphincter control appeared. There was no correlation of spinal fluid examination results with progress of the optic atrophy. In fact, optic atrophy continued to progress despite disappearance of spinal fluid abnormalities. A trend toward negative spinal fluid was generally observed.

## Interstitial Keratitis

Interstitial keratitis is a less common cause of impaired vision or blindness than is optic atrophy. Moreover, in consideration of laws requiring premarital serologic tests and the now current practice of routine test in pregnancy and treatment with penicillin, congenital syphilis and interstitial keratitis should show a decreasing incidence. Nevertheless, we are still seeing patients with interstitial keratitis who were born subsequent to enactment of premarital laws and whose mothers were untreated during pregnancy.

It is generally stated that 30 to 50 percent of all patients with congenital syphilis develop interstitial keratitis (*10*).

### *Clinical Diagnosis*

An acute attack of interstitial keratitis (also termed active, inflammatory) is characterized by three stages—(1) onset, (2) full development, and (3) recovery. At onset there is pain, photophobia, lacrimation, and pericorneal injection. The latter (a small area of inflammation in the sclera encircling the periphery of the cornea) is always present and should not be confused with congestion of the conjunctival vessels which is likewise present. The cornea lacks its crystal-clear appearance and is hazy either in part or in its entirety. There soon appear grayish opacities (macules) of irregular shape and size which usually exist in greatest numbers in the periphery. These opacities are inflammatory infiltrates in the parenchyma of the cornea. They are, therefore, not superficial (a differentiating feature). This is best evaluated by magnification (binocular loupe or slit-lamp examination, corneal microscope, slit-lamp microscopy). As the disease progresses the corneal opacities increase in size and coalesce.

Iridocyclitis always accompanies acute interstitial keratitis—the iris (if not obscured by corneal opacities) is swollen and appears muddy; its normal furrows are obliterated. The corneal opacities increase in size and coalesce.

The height of these symptoms constitutes the stage of full development. Reduction of visual acuity is at its maximum. At this stage vessels situated deep in the parenchyma commence growing into the cornea from its margins. The advancing vessels in the stroma give a reddish color to the invading cornea and these patches of color are called "salmon" patches. These vessels forecast beginning resolution of the inflammatory process which constitutes the stage of recovery.

In the recovery stage the opacities become less dense, more transparent, so that coalescent patches break up and relatively clear areas of the cornea become interspersed between the opacities. This resolution takes place from the periphery toward the center. The former, therefore, becomes relatively clear and the iris, if heretofore obscured, becomes visible. Subjective symptoms begin to abate, as does pericorneal injection, and reduction of vision becomes less.

### *Grades of Severity*

There is considerable variation in the severity of acute interstitial keratitis and the duration of the stage of full development and of recovery. Pericorneal injection and subjective symptoms may disappear in from a few months to many months after onset of the disease. From the viewpoint of prognosis and evaluation of treatment, as later discussed, it is desirable to classify the disease into the following three grades:

*Severe.*—The infiltration of the cornea is so dense and widespread as to preclude view of the iris; pericorneal injection and subjective symptoms are pronounced. Considerable reduction of vision to ability to count fingers.

*Mild.*—The infiltration is minimal as is pericorneal injection and subjective symptoms. There is little or no reduction of vision.

*Moderate.*—This embraces cases between severe and mild grades. The infiltration is more diffuse than in the mild grade and there is correspondingly more pericorneal injection and loss of vision.

### *Age and Sex Incidence*

The youngest patient we observed was 2 years old; the oldest, 60 (he had recurrence of acute interstitial keratitis). The predominating age at onset is between the ages of 6 and 16 years. Its occurrence as an initial attack after the age of 30 is uncommon. Females are more affected than males. In Klauder and Vandoren's study of 532 patients, 63 percent were females (*11*).

### *Unilateral and Bilateral Involvement*

At onset, one eye is usually affected. In a study (*11*) of 355 patients, Klauder and Vandoren observed that 42 percent had involvement of the second eye within 1 month of the first eye. In an additional 29 percent, such involvement occurred at intervals ranging up to 2 years. Of patients observed 10 years, the disease had become bilateral in 78 percent. We believe that if observation of the patient is sufficiently long, in almost 100 percent the second eye will become affected. Apparently no heretofore employed treatment prevents second-eye involvement.

Second-eye involvement may occur during antisyphilitic treatment of the first eye and also at varying periods after considerable antisyphilitic treatment. We have observed its occurrence after serologic tests have become negative. In a comparable manner an initial attack of interstitial keratitis has been observed after what may be regarded as adequate antisyphilitic treatment (including penicillin).

### *Recurrence*

Recurrence or relapse refers to the reappearance of acute interstitial keratitis in an eye that has recovered from a previous acute attack. As reported by different writers, this occurs in from 10 to 20 percent (*11–13*). Recurrence may appear at varying periods (some reported cases as long as 38 years (*12*)) after the first attack. It may occur in the first eye affected before the second eye has become involved. Reported studies suggest that recurrences are less in treated than in untreated cases. Here again, no heretofore employed treatment has prevented recurrences.

### *Enigma of the Disease*

Interstitial keratitis is intimately associated with congenital syphilis. Although its occurrence has been reported in acquired syphilis, we believe this is rare. We have never observed the disease in a proved case of acquired syphilis.

Interstitial keratitis frequently occurs in the oldest child. (Doubtless this is in accordance with Kassowitz's law.) At times, however, the disease is observed in two members of the same family. Another peculiar feature of the disease is its association with symmetrical serous synovitis (Clutton's joints). When the latter occurs it invariably precedes the occurrence of interstitial keratitis. Eighth-nerve involvement of congenital syphilis, Clutton's joints, and interstitial keratitis constitute a distinctive triad of congenital infection concerning which little knowledge has been added since Hutchinson's time. Each of these conditions is notably resistant to antisyphilitic treatment.

These puzzling features of the disease, the failure of antisyphilitic treatment in prevention of an initial attack, of second-eye involvement, and of recurrences, suggest that the disease is somehow not entirely a syphilitic process or caused by invasion of the *Treponema pallidum.* The absence of striking response to penicillin, a powerful treponemicide, is additional evidence for this hypothesis.

### *Endocrine Gland Relation*

Older writers have discussed possible endocrine gland relation in pathogenesis and have employed thyroid gland in treatment. Our endocrinologic studies (*14*) of patients with interstitial keratitis show supportive evidence of such relation. The incidence of acne vulgaris among our patients was considerably less than among normal persons in the same age range. This suggests a suppression of androgenic function. The trend of basal metabolic rate determination was low, more especially in patients with severe interstitial keratitis. Other evidence of hypothyroidism (low values for blood-protein-bound iodine and low percentage take-up of the thyroid gland of radioactive iodine) were observed. Some patients had low values of 17-ketosteroids in the urine. None of the patients, however, had frank myxedema.

### *Treatment*

It is important to initiate treatment as early as possible in the acute attack. In the stage of recovery the trend is toward complete retrogression of inflammation. The effect of treatment in the stage of recovery is less apparent than in earlier stages. After inflammation has disappeared the value of any treatment in causing disappearance of corneal opacities is to be questioned. Spontaneous absorption of opacities occurs to some degree (at times to a surprising degree), which may require as long as 1 year for its consummation.

*Fever therapy.*—We emphasize fever as the outstanding agent in treatment. We believe fever produced by typhoid vaccine given intravenously suffices, and do not regard malaria as necessary. Injections are given every other day in sufficient dosage to produce fever of 102° F. to 103° F. (and employ it in ambulatory patients if necessary).

For mild grades of interstitial keratitis 4 to 6 fever rises may suffice (indeed as the only treatment) to attain the stage of recovery, about 8 fever rises for the moderate grade, and 12 to 14 for the severe grade (fever rises of less than 100° F. are not considered).

*Metal chemotherapy.*—During fever therapy, antisyphilitic treatment comprising either metal chemotherapy or penicillin is initiated. Our study (*15*) failed to show superior results of fever combined with penicillin compared to fever combined with metal chemotherapy. There are advantages of displacing chemotherapy with penicillin; the patient's time and man-hour labor of clinic personnel are conserved.

Metal chemotherapy, however, exerts a nonspecific effect on many inflammatory ocular processes (mercury has long been used for this effect). We favor metal chemotherapy in severe cases, at least in the inflammatory stage of the disease, terminating treatment of the underlying syphilitic infection with penicillin.

If metal chemotherapy is employed, an arsenical is given weekly for 8 injections, alternating with 8 weekly injections of bismuth compound. Continuous treatment is given until inflammatory symptoms have disappeared. Then rest periods of 1 month are instituted between such courses. We regard a total of 20 to 30 injections of an arsenical and 40 to 60 injections of bismuth sufficient for treatment of congenital syphilis.

*Penicillin.*—If penicillin is employed, a total of 2,400,000 units of penicillin (either aqueous or in an oil base) are administered in about 12 days. In our study (*15*) a larger total amount of penicillin or re-treatment with penicillin in refractory cases did not appear to be of more benefit.

Following the aforegoing treatment with either metal chemotherapy or penicillin, the patient is discharged from further antisyphilitic treatment despite positive serologic tests. The latter may or may not become less positive or negative in the course of years.

*Treatment of involvement of the second eye and recurrence of the disease in the same eye.*—The necessity and the value of additional antisyphilitic treatment may be questioned. Excluding fever, the indication of additional antisyphilitic treatment is not clear. In treatment of such patients fever should routinely be used; this alone may suffice in mild and moderate grades of involvement. In severe cases the patient may be given the benefit of the doubt as to the value of additional penicillin or metal chemotherapy.

*Glandular therapy.*—More recently we have employed desiccated thyroid gland in conjunction with the aforementioned plans of treatment. We especially give it, in severe cases, in doses of 2 or 3 grains daily for 2 to 4 weeks. So far, its use in severe cases has been of benefit.

Thirteen patients with acute interstitial keratitis were treated with either ACTH or cortisone locally with and without parenteral injections. During this treatment no other therapy except a mydriatic was employed. It was observed that patients with severe interstitial keratitis were not benefited by ACTH or cortisone administered for 7 to 10 days. This was in contrast to discernible benefit of other severe cases after 7 to 10 days of fever plus thyroid therapy. Mild and moderate cases were benefited to a variable degree; in some instances the effect was dramatic after local therapy with cortisone. In some patients, however, the disease promptly relapsed after cessation of therapy.[3]

*Final visual acuity with refraction.*—Following disappearance of interstitial keratitis the patient should be refracted since visual acuity in the majority is improved with glasses. Myopia with mixed astigmatism is a frequent refractive error. To permit maximum absorption of corneal opacities, at least 1 year should elapse after the disappearance of inflammatory symptoms. There is, of course, a difference in final visual acuity if residual opacities are in the center or the periphery of the cornea. In the former event an optical iridectomy should improve vision.

*Results of treatment.*—It is desirable to evaluate results of treatment in terms of visual acuity with refraction determined at least 1 year after disappearance of inflammatory symptoms.

More accurate evaluation concerns results of treatment of the three grades of acute interstitial keratitis. Best final results are observed in the mild and moderate grades. Indeed we observed favorable progress in patients with the mild grade in whom we purposely withheld systemic treatment; only a mydriatic was employed (*15*).

The real problem of therapeusis is the severe grade of interstitial keratitis, since the final results may be industrial blindness. This is considerably less likely in the moderate and mild grades of interstitial keratitis. The final visual acuity of patients with these grades is more likely in the higher range. To my knowledge, in no reported study of the end result of treatment of interstitial keratitis has severity of the disease at onset of treatment been classified.

The earlier statistics of the final visual acuity of treated patients with interstitial keratitis ranged up to as high as 20 percent with visual acuity of less than 6/60 (20/200). With more advanced methods of treatment, especially fever, this percentage has been reduced to about 10 percent of the total of affected eyes. In our study (*15*), in which fever and penicillin or fever and chemotherapy were employed, the percentage of final visual acuity of between 6/60 (20/200) and 1/60 (3/200) of 97 affected eyes of 59 patients was 8.2; and 2.1 where the vision was less than 1/60.

It is to be noted that these figures of percentage of visual acuity below 6/60 represent the total number of affected eyes and not the percentage of patients who had visual acuity of that grade. In the fever-penicillin-treated group of 59 patients, only 1 patient was industrially blind (6/60 to 1/60 in each eye) and 1 was essentially blind (with light perception in each eye). Of the fever-metal-chemotherapy group of 54 patients, 3 were industrially blind; 1 was essentially blind, i. e., able to count fingers with either eye.

There is no report of the end results of treatment for interstitial keratitis where industrial blindness has been eliminated. That achievement should be the goal in therapeusis of the disease.

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[3] More detailed results of thyroid, of ACTH, and of cortisone therapy will be reported.

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# The Effect of an Additional 4 Minutes' Rotation on Reactions to the VDRL Slide Flocculation Test[1]

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This study was undertaken to learn what effects, if any, could be demonstrated by allowing the serum used in the VDRL slide flocculation test (*1*) to be rotated for an additional 4-minute period as in the Mazzini microflocculation test, but without a second drop of VDRL antigen emulsion.

In the performance of the qualitative Mazzini microflocculation test with serum as described in the *Manual of Serologic Tests for Syphilis* (*1*), attention is directed to that portion of the procedure which states:

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[3] Director of Laboratories.

> "f. Add a second drop of antigen suspension to each test which gives a 1+, or 2+, or atypical reaction.
>
> "g. Rotate the slide for a second 4-minute period.
>
> "h. Examine microscopically. If the reaction is stronger after the addition of the second drop of antigen suspension, record the stronger result. If the reaction is the same or weaker after the addition of the second drop of antigen suspension, record the original result."

Interest in the behavior of the VDRL slide flocculation test began when it was observed that (1) when the Mazzini slide test and the VDRL slide test were performed simultaneously on the same specimen, on the same slide, and (2) when a second drop of Mazzini antigen suspension was added to the Mazzini test and the slide was rotated for a second 4-minute period, a recheck of the VDRL test (which now had also been rotated for a second 4-minute period by virtue of being on the same slide) showed in many instances that reactions to the VDRL tests had become more definite, more clear, and more positive. Reactions to the VDRL tests originally had been negative, indefinite, or weak.

The serums of known syphilitic donors and presumably negative donors, furnished by the United States Public Health Service in its annual evaluation of State laboratories in 1950, were used to check the sensitivity and specificity of such a procedure. Also, approximately 954 serums which reacted negatively to the Mazzini test were chosen from the daily laboratory "run" over a period of months for further testing of specificity.

Lipoidal antigens manufactured in the Oklahoma Bureau of Laboratories were used in the performance of the Mazzini and simplified Kolmer complement-fixation tests (*1*). A commercial antigen was used in the performance of the VDRL slide flocculation test.

Table 1 gives the results of the VDRL test on known syphilitic serums after 4 minutes' rotation, and after an additional 4-minute period (a total rotation time of 8 minutes), in comparison with the results of the Mazzini and the simplified Kolmer complement-fixation tests. It will be noted that the VDRL test performed in accordance with the method described in the *Manual of Serologic Tests for Syphilis* is slightly less sensitive in regard to the resulting number of positive reactions than with either the Mazzini or the Kolmer test. After an additional 4-minute rotation period, however, the number of positive reactions obtained by the VDRL slide test rises sharply. The number of false-negative reactions is materially reduced and the weakly positive classification is almost entirely eliminated.

Table 2 shows the results of the VDRL test on presumably nonsyphilitic serums

**Table 1.**—*Comparison of serologic results on serums from syphilitic donors*

| Test | Result | | | |
|---|---|---|---|---|
| | Positive | Weakly positive | Negative | Total specimens |
| VDRL (4 minutes' rotation) | 154 | 30 | 38 | 222 |
| VDRL (8 minutes' rotation) | 186 | 7 | 29 | 222 |
| | | *Doubtful* | | |
| Mazzini | 166 | 24 | 32 | 222 |
| Kolmer | 164 | 6 | 51 | 221 |

**Table 2.**—*Comparison of serologic results on serums from 149 nonsyphilitic donors*

| Test | Result | | | |
|---|---|---|---|---|
| | Positive | Weakly positive | Negative | Total specimens |
| VDRL (4 minutes' rotation) | 0 | 0 | 149 | 149 |
| VDRL (8 minutes' rotation) | 0 | 0 | 149 | 149 |
| | | *Doubtful* | | |
| Mazzini | 0 | 1 | 148 | 149 |
| Kolmer | 1 | 0 | 148 | 149 |

after 4 minutes' rotation, and after the additional 4-minute period (a total rotation time of 8 minutes), in comparison with the results of the Mazzini and the simplified Kolmer tests. No false-positive reactions resulted with either VDRL testing method.

Table 3 presents the results of 954 negative Mazzini specimens after 4 minutes' rotation, and after an additional 4-minute period (a total rotation time of 8 minutes). In no case did any false-positive reactions result from using either the 4-minute or the 8-minute period.

**Table 3.—*Serologic results on 954 specimens previously classified as negative from using the Mazzini slide flocculation test***

| Test | Result | | | |
|---|---|---|---|---|
| | Positive | Weakly positive | Negative | Total specimens |
| VDRL (4 minutes' rotation) | 0 | 0 | 954 | 954 |
| VDRL (8 minutes' rotation) | 0 | 0 | 954 | 954 |

Table 4 lists the 34 individual specimens wherein changes in VDRL slide flocculation readings occurred, in comparison with the results of the Mazzini and the simplified Kolmer tests. The clinical diagnosis of each specimen is listed as furnished by the United States Public Health Service in its annual evaluation of State laboratories.

"The ability of a test to elicit definite responses such as positive or negative, with a minimum of doubtful reactions, is a desirable characteristic (2)." Apparently, the most significant advantages of rechecking all indefinite or incomplete reactions to the VDRL tests by an addi-

**Table 4.—*Comparison of serologic results of specific specimens from syphilitic donors wherein changes in VDRL slide flocculation test readings occurred***

| Clinical diagnosis | Mazzini | Kolmer | VDRL (4 minutes) | VDRL (8 minutes) |
|---|---|---|---|---|
| Cardiovascular | 1D | 4P | N | WP |
| Late latent | 4P | 3P | WP | P |
| Late latent | 4P | 4P | WP | P |
| Congenital | 3P | N | WP | P |
| Late latent | 4P | 4P | WP | P |
| Late latent | 2D | D | WP | P |
| Symptomatic central nervous system | 4P | N | WP | P |
| Asymptomatic central nervous system | 2D | D | WP | P |
| Late latent | 2D | 4P | WP | P |
| Early latent | 4P | 3P | WP | P |
| Late latent | 4P | N | WP | P |
| Late latent | 2D | 2P | N | P |
| Late latent | 1D | 3P | N | P |
| Suspect | 4P | 4P | WP | P |
| Late latent | 4P | 4P | WP | P |
| Late latent | 4P | 4P | WP | P |
| Asymptomatic central nervous system | 2D | 4P | N | WP |
| Symptomatic central nervous system | 1D | N | WP | P |
| Asymptomatic central nervous system | 2D | N | WP | P |
| Secondary | 2D | N | WP | P |
| Secondary | 3P | N | WP | P |
| Cardiovascular and central nervous system | 1D | N | WP | P |
| Asymptomatic central nervous system | N | N | N | P |
| Primary | 2D | 4P | WP | P |
| Late latent | 3P | 3P | WP | P |
| Late latent | 3P | 4P | WP | P |
| Primary | 2D | 3P | WP | P |
| Asymptomatic central nervous system | 2D | 4P | N | P |
| Late latent | 1D | 1P | WP | P |
| Late latent | 2D | N | N | P |
| Symptomatic central nervous system | 2D | N | WP | P |
| Secondary | 1D | N | N | P |
| Primary | 4P | 2P | WP | P |
| Primary | N | N | N | WP |

N, negative; D, doubtful; WP, weakly positive; P, positive.

NOTE: After a total rotation time of 8 minutes, 9 specimens changed from negative to weakly positive or positive, and 25 specimens changed from weakly positive to positive.

tional 4 minutes' rotation would be the elimination of vague results and, at the same time, a substantial reduction in the number of weakly positive reactions. Also, an increased number of positive reactions without any apparent loss of specificity are obtained by the additional testing period.

The results of this study indicate the desirability of testing further all indefinite (not clear-cut negative) or weak reactions to VDRL slide flocculation tests by subjecting the slide to an additional 4-minute rotation period.

Perhaps further investigation into the actual mechanics of the VDRL test or its antigenic components might reveal the cause of these apparently incomplete reactions.

### Summary

1. Reaction of serums to the VDRL slide flocculation test in relation to the rotation time is reported.

2. Data are presented showing the actual effects of an additional 4-minute rotation period on reactions to the VDRL slide flocculation test, in comparison with the Mazzini microflocculation and simplified Kolmer complement-fixation tests.

### References

1. Manual of Serologic Tests for Syphilis. Supplement No. 22 to J. Ven. Dis. Inform., 1949. P. 99.
2. Harris, Ad; Rosenberg, A. A.; Del Vecchio, E. R.: The VDRL slide flocculation test for syphilis. II. A supplementary report. J. Ven. Dis. Inform., 29: 72–75, March 1948.

# CURRENT LITERATURE

## A. M. A. Arch. Dermat. & Syph., Chicago

Treatment of neurosyphilis with penicillin combined with artificial fever therapy. II. Further observations. Norman N. Epstein and James R. Allen. A. M. A. Arch. Dermat. & Syph., 63: 419–425, Apr. 1951.

In this study, 81 patients with various forms of neurosyphilis were treated with procaine penicillin in oil containing 2 percent aluminum monostearate combined with artificial fever induced by the "blanket method." From the results, authors conclude that a combination of penicillin with fever therapy is indicated for patients with dementia paralytica, its tabetic form, and primary optic atrophy, and for those who do not respond satisfactorily to penicillin alone.

Observations on treatment of cardiovascular system syphilis with aqueous penicillin G. Sture A. M. Johnson and Herman H. Shapiro. A. M. A. Arch. Dermat. & Syph., 63: 426–432, Apr. 1951.

A report is presented on the treatment of 17 patients with syphilitic heart disease with aqueous penicillin G given intramuscularly. Authors feel it is speculative whether the total dosage of 4,008,000 units administered in this series will be adequate until the patients have been followed to their terminal phase and the results compared with those of other investigators. A review of the five cases which ended fatally would indicate that the orthodiagram is much more valuable than the electrocardiogram, roentgenologic or physical examination, or blood pressure determination for prognosticating the course of the patients still living.

Aureomycin and its effect in early syphilis. Progress report. Jack Rodriquez, Frederick Plotke, Seymour Weinstein, and William W. Harris. A. M. A. Arch. Dermat. & Syph., 63: 433–439, Apr. 1951.

Sixty-seven patients with darkfield-positive lesions of early syphilis were treated with 70 gm. of aureomycin given orally in 11⅓ days and observed over a period of 6 to 7 months. Preliminary results of this study present evidence that the drug is effective in the treatment of early syphilis. Continued studies, how-

A. M. A. ARCH. DERMAT. & SYPH., CHICAGO—Continued

ever, are necessary to determine its effectiveness after longer periods of observation and its position in the therapeutic armamentarium against syphilis.

A. M. A. ARCH. INT. MED., CHICAGO

Syphilis. A review of the recent literature. Herman Beerman, Leslie Nicholas, William T. Ford, and Minerva S. Buerk. A. M. A. Arch. Int. Med., 87: 287–322, Feb. 1951; 424–468, Mar. 1951.

An extensive review of the literature during the period July 1, 1949, to July 1, 1950, is presented. The review includes history, diagnosis, prognosis, immunity, clinical manifestations, and treatment of all types of syphilis, as well as contact tracing and venereal disease control programs.

A. M. A. ARCH. OPHTH., CHICAGO

Use of adrenocorticotropic hormone and cortisone in ocular disease. J. A. Olson, E. H. Steffensen, R. W. Smith, R. R. Margulis, and E. L. Whitney. A. M. A. Arch. Ophth., 45: 274–300, Mar. 1951.

Results of the experimental use of these two drugs in the treatment of 51 patients with a wide variety of ocular lesions, including 1 case of atypical congenital syphilitic keratitis, are reported. Although the authors are reluctant to draw any conclusions about the syphilitic case, they feel that the total treatment with ACTH and the parenteral and topical administration of cortisone, in turn, appeared to have materially benefited the patient and that a satisfactory result was obtained.

Adrenocorticotropic hormone (ACTH) and cortisone in ophthalmology. Report of cases. Harold G. Scheie, George S. Tyner, John A. Buesseler, and Joseph E. Alfano. A. M. A. Arch. Ophth., 45: 301–316, Mar. 1951.

The purpose of this paper was to present preliminary clinical observations on the use of ACTH and cortisone when administered systemically and locally in the treatment of various ocular lesions. Three patients with syphilitic interstitial keratitis treated systemically with ACTH, and one patient given topical applications of cortisone, gave encouraging results. Treatment of one case of lymphogranuloma venereum keratitis with topical applications of cortisone after corneal transplants resulted in failure.

Early clinical results of ACTH and cortisone treatment of ocular diseases. J. Robert Fitzgerald, John G. Bellows, Justin M. Donegan, Richard C. Gamble, Arlington C. Krause, William A. Mann, Maurice D. Pearlman, and Theodore N. Zekman. A. M. A. Arch. Ophth., 45: 320–333, Mar. 1951.

Results of treatment of 198 patients with a variety of ocular diseases at Chicago eye clinics are presented. One patient with acute granulomatous uveitis and a four plus Wassermann reaction recovered after 14 days of treatment with cortisone administered systemically. One patient with syphilitic interstitial keratitis failed to respond to treatment with cortisone and ACTH.

A. M. A. ARCH. SURG., CHICAGO

Aureomycin therapy in lymphogranuloma venereum. Archibald Fletcher, M. Michael Sigel, and H. A. Zintel. A. M. A. Arch. Surg., 62: 239–250, Feb. 1951.

In this study, 19 patients with lymphogranuloma venereum, including 3 with inguinal adenitis, 2 with proctitis, and 14 with rectal strictures, were treated with total dosages of from 28 to 70 gm. of aureomycin, administered orally in most cases, and followed for periods up to 1 year. The inguinal adenitis patients and those with early rectal infections showed an encouraging clinical response to the therapy, while the response of the patients with more chronic forms of the disease was equivocal.

Homologous transplantation of tissues. A review of the literature. W. P. Longmire, Jr., and S. W. Smith. A. M. A. Arch. Surg., 62: 443–454, Mar. 1951.

The literature on homologous transplantation of tissues is reviewed and clinical and experimental experiences with homografts are discussed. Authors feel that, although no incidence of transmission of syphilis by homografting is known to have occurred, it would, nevertheless, be theoretically possible, and the same precautions in this regard should be taken in selecting a skin donor as are used for blood donors.

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AM. J. MED., NEW YORK

Criteria for the management of neurosyphilis. Bernhard Dattner, Evan W. Thomas, and Lopo De Mello. Am. J. Med., 10 : 463–467, Apr. 1951.

Spinal fluid examinations are a reliable indicator of the activity of a syphilitic process in the central nervous system. Inactive neurosyphilis is demonstrated in the spinal fluid by normal cell counts and gradually falling values in other tests. The need for differentiating between active and inactive neurosyphilis is discussed, as well as rules for establishing the activity by means of spinal fluid examinations.

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AM. J. OBST. & GYNEC., ST. LOUIS

The racial incidence and mortality of ectopic pregnancy. George W. Anderson. Am. J. Obst. & Gynec., 61 : 312–320, Feb. 1951.

The literature is reviewed and a report is presented of a study of 862 ectopic pregnancies in 19 Baltimore hospitals during a period of 5 years (1944–48). The study indicates that ectopic pregnancy is more frequent in the Negro woman than in the white woman by about 50 percent. The role of chronic inflammatory disease in its relation to the etiology of ectopic pregnancy is discussed. In view of the high incidence of gonorrheal infection in Negro women, it appears that the differential in racial incidence of ectopic pregnancy reported in this paper is attributable to a higher incidence of pelvic inflammatory disease in Negroes. If this be true, the more efficacious methods of treating gonorrheal infection now in use may lead to a reduction in incidence of this frequent and grave complication of pregnancy.

Beta-glucuronidase studies in women. III. *Trichomonas vaginalis* vaginitis and vaginal fluid enzyme activity. S. C. Kasdon, J. McGowan, W. H. Fishman, and F. Homburger. Am. J. Obst. & Gynec., 61 : 647–652, Mar. 1951.

Detailed results of a study of 96 nonpregnant, noncancerous women, 40 years of age, for vaginal fluid beta-glucuronidase activity in its relation to *Trichomonas* infestation are presented. Sixty-three percent of 64 specimens in the *Trichomonas* group exhibited values for beta-glucuronidase activity below 300 units per gram, which compared closely with 59 percent obtained in women showing no *Trichomonas* organisms. Authors consider trichomonas vaginitis as a factor in explaining vaginal beta-glucuronidase phenomena to be of some significance, but the presence of organisms without clinical symptoms is not necessarily accompanied by high vaginal fluid beta-glucuronidase activity.

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AM. J. PSYCHIAT., BALTIMORE

Neurosyphilis. Augustus S. Rose and Vincent P. Perlo. Am. J. Psychiat., 107 : 530–532, Jan. 1951.

Penicillin therapy has dominated all investigations in the field of neurosyphilis for the past 5 years. Early results published from many treatment centers have been remarkably similar. The authors review the literature of the past year, in which late results, which are of critical importance in the final evaluation of penicillin, are now beginning to appear.

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AM. J. PUB. HEALTH, NEW YORK

Joint housing of hospitals, health departments, and laboratories. A survey of joint housing. Milton Terris. Am. J. Pub. Health, 41 : 319–325, Mar. 1951.

This is a report on a survey undertaken by the Subcommittee on Medical Care of the American Public Health Association to determine the extent and methods of coordination of services, the advantages and disadvantages of joint housing, and the general conclusions which health officers and hospital directors had reached as a result of their practical experience. Cooperative activity in venereal disease control between health officers and hospitals in several counties is briefly discussed.

Joint housing of hospitals, health departments, and laboratories. The hospital administrator's viewpoint. E. Dwight Barnett. Am. J. Pub. Health, 41 : 326–330, Mar. 1951.

AM. J. PUB. HEALTH, NEW YORK.—Con.

From the viewpoint of a hospital administrator, close association of hospitals and health departments is essential and should be developed as rapidly as possible. From personal experience, the author has found that consolidation and joint housing of two venereal disease clinics in Detroit resulted in increased efficiency and better use of personnel.

Joint housing of hospitals, health departments, and laboratories. The health officer's viewpoint. William A. Harris. Am. J. Pub. Health, 41 : 331–333, Mar. 1951.

A deputy State and county health officer discusses the advantages resulting from the joint housing of the health department of Charles County, Md., in the Physician's Memorial Hospital in La Plata. Clinics in various fields, including venereal disease, are held regularly at the hospital, and the health department has a contract with the hospital for rapid treatment of patients with early syphilis.

AM. J. SURG., NEW YORK

Evaluation of Chloromycetin as an adjunct to the surgical management of lymphogranuloma venereum and segmental ulcerative colitis. Robert J. Rowe. Am. J. Surg., 81 : 42–54, Jan. 1951.

Recent advances relating to etiology, incidence, pathology, diagnosis, and treatment of lymphogranuloma venereum are reviewed. Thirty-two patients with lymphogranuloma venereum and four with nonspecific ulcerative intestinal disease were treated with Chloromycetin at the Dallas Syphilis and Venereal Disease Clinic and the Dallas City-County Hospital. Although inconclusive at this time, results of this study indicate that Chloromycetin shows promise of effecting a cure in the acute cases and palliation in the moderately advanced rectal lesions.

AM. SURGEON, ATLANTA

Aureomycin treatment of rectal strictures. Leon Banov, Jr. Am. Surgeon, 17 : 143–149, Feb. 1951.

Twelve Negro women with rectal strictures of lymphogranuloma venereum were treated at the Medical College Clinic of the State of South Carolina. All patients received aureomycin orally in the form of 250-mg. capsules. All reported subjective improvement within a few days. Six of the 12 remained improved from 11 to 18 months. There was little or no change in one patient.

ANN. SURG., PHILADELPHIA

Aureomycin as an aid in abdominal surgery. Louis T. Wright and Aaron Prigot. Ann. Surg., 133 : 364–373, Mar. 1951.

A review of the literature on the effectiveness of aureomycin is presented. From an analysis of results obtained in several series of patients, including 22 with rectal strictures due to lymphogranuloma venereum, treated at Harlem Hospital, authors conclude that the drug is a valuable aid in the treatment of these strictures because of its specific action against the causative organism and its antibacterial activity.

ARIZONA MED., PHOENIX

The effect of concentration of sera on the serological tests for syphilis. Edward L. Breazeale and L. F. Pierce. Arizona Med., 8 : 41–44, Mar. 1951.

The purpose of this study was to evaluate the relative effects of concentration by dialysis and evaporation. Tables showing the effect of serum concentration on seroactivity and the effect of concentration by dialysis on seroactivity are given. Authors feel that from the data presented in this paper it would appear that the active ingredient in any seroactive serum is some normal constituent that has become dominant due to an actual increase of that element or the decrease in some other portion.

BETTER HEALTH, LINCOLN

Venereal disease activities. Better Health, 10 : 4, Mar.–Apr. 1951.

Of 225 previously treated World War II veterans referred to the Venereal Disease Division of the State Health Department by the Veterans' Administration, 50 percent of these were located. Of those on whom tests were obtained, only three positive serologies and one positive spinal were found. Another survey was made of children of previously treated pregnant mothers who had received penicillin therapy at the Rapid Treatment Center since

BETTER HEALTH, LINCOLN—Continued

1945. No cases of congenital syphilis were present in the children of those mothers on whom blood tests were made.

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BRIT. M. J., LONDON

Aureomycin and chloramphenicol in chancroid. R. R. Willcox. Brit. M. J., No. 4705: 509–510, Mar. 10, 1951.

Experiments undertaken in Africa during 1949, in which volunteers were inoculated with chancroidal bubo fluid, are described. Results indicated that both aureomycin and chloramphenicol were capable of preventing the experimental infection in man, and also in rendering the bubo fluid avirulent. Two patients with soft sores were successfully treated with chloramphenicol and one with aureomycin.

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BULL. JOHNS HOPKINS HOSP., BALTIMORE

Cortisone in experimental syphilis. (A preliminary note). Thomas B. Turner and David H. Hollander. Bull. Johns Hopkins Hosp., 87: 505–509, Nov. 1950.

In these studies, the authors found that under the influence of cortisone therapy syphilomas induced in rabbits by intradermal or intratesticular inoculation of *Treponema pallidum* show striking alterations from the picture usually observed in experimental syphilis, in that the lesions become soft and spongy, there is an excessive accumulation of a mucoid material tentatively identified as hyaluronic acid, treponemes are unusually abundant, and the production of Wassermann reagin seems to be inhibited.

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BULL. NEW YORK ACAD. MED., NEW YORK

Modern treatment of syphilis. Evan Willing Thomas. Bull. New York Acad. Med., 27: 175–183, Mar. 1951.

In this lecture, given at the New York University College of Medicine on December 8, 1950, the author discussed the use of penicillin, treatment schedules, dosage, evaluation of therapy, relapses, and serologic tests for syphilis.

The present status of antibiotics in bacterial infections. Maxwell Finland. Bull. New York Acad. Med., 27: 199–220, Apr. 1951.

In this review of the literature, the development and use of antibiotics in treatment and prophylaxis of various infections, including gonorrhea, syphilis, and ophthalmia neonatorum, are discussed.

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CANAD. J. PUB. HEALTH, TORONTO

An evaluation of some procedures used in multiphasic screening. William A. Sodeman. Canad. J. Pub. Health, 42: 43–51, Feb. 1951.

Multiphasic screening examinations should be modified and set up to fit specific groups under consideration, based upon age, socieconomic status, geographic area, and other factors. In a series of 2,971 examinations made primarily for detection of cancer at the Tulane University School of Medicine, only 7 were found to have positive Wassermann reactions.

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INDIAN J. VEN. DIS., BOMBAY

Syphilotherapy with a single dose of penicillin. P. N. Rangiah. Indian J. Ven. Dis., 16: 134–141, Oct.–Dec. 1950.

After a brief review of the literature, the author discusses the use of procaine penicillin G with 2 percent aluminum monostearate in treatment of venereal diseases, based upon personal observations of 72 cases of primary, 117 cases of secondary, and 59 cases of congenital syphilis.

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J. A. M. A., CHICAGO

Pinta and yaws in Ecuador. Foreign Letters. J. A. M. A., 145: 922, Mar. 24, 1951.

Statistics are presented on the incidence of yaws and pinta among white, Negro, and Indian inhabitants of various regions of Ecuador. Cause, spread, and control of these diseases are briefly discussed.

# STATISTICS

## Cases of Syphilis and Gonorrhea Reported to the Public Health Service, Total United States, Including Territories

| Period | All sources | | | | | | Private physicians | | | | | | Clinics, hospitals, and other institutions | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Syphilis | | | | | | Syphilis | | | | | | Syphilis | | | | | |
| | Total [a] | Primary and secondary | Early latent | Congenital | Late and late latent | Gonorrhea | Total [a] | Primary and secondary | Early latent | Congenital | Late and late latent | Gonorrhea | Total [a] | Primary and secondary | Early latent | Congenital | Late and late latent | Gonorrhea |
| *1942* | | | | | | | | | | | | | | | | | | |
| July–Sept. | 145, 092 | 20, 990 | 36, 034 | 4, 821 | 65, 636 | 69, 211 | 53, 412 | 10, 148 | 9, 986 | 1, 399 | 21, 483 | 24, 130 | 91, 680 | 10, 842 | 26, 048 | 3, 422 | 44, 153 | 45, 081 |
| Oct.–Dec. | 151, 641 | 21, 180 | 37, 573 | 4, 349 | 68, 865 | 70, 565 | 55, 647 | 10, 173 | 9, 681 | 1, 303 | 22, 148 | 23, 471 | 95, 994 | 11, 007 | 27, 892 | 3, 046 | 46, 717 | 47, 094 |
| *1943* | | | | | | | | | | | | | | | | | | |
| Jan.–Mar. | 140, 583 | 21, 473 | 39, 265 | 4, 229 | 61, 148 | 68, 232 | 49, 356 | 9, 937 | 9, 088 | 1, 254 | 20, 370 | 20, 201 | 91, 227 | 11, 536 | 30, 177 | 2, 975 | 40, 778 | 48, 031 |
| Apr.–June | 138, 186 | 20, 960 | 38, 307 | 4, 535 | 60, 222 | 72, 324 | 47, 897 | 9, 446 | 9, 569 | 1, 202 | 20, 427 | 19, 314 | 90, 289 | 11, 514 | 28, 738 | 3, 333 | 39, 795 | 53, 610 |
| July–Sept. | 129, 554 | 20, 697 | 34, 744 | 4, 368 | 55, 902 | 80, 361 | 44, 304 | 9, 038 | 8, 946 | 1, 130 | 18, 844 | 21, 733 | 85, 250 | 11, 659 | 25, 798 | 3, 238 | 37, 058 | 58, 628 |
| Oct.–Dec. | 113, 258 | 19, 354 | 29, 260 | 3, 450 | 49, 584 | 75, 299 | 40, 709 | 8, 779 | 8, 335 | 988 | 17, 235 | 20, 232 | 72, 549 | 10, 575 | 20, 925 | 2, 462 | 32, 349 | 55, 067 |
| *1944* | | | | | | | | | | | | | | | | | | |
| Jan.–Mar. | 117, 383 | 20, 144 | 31, 080 | 3, 875 | 53, 684 | 74, 267 | 40, 903 | 8, 624 | 8, 983 | 954 | 17, 745 | 18, 465 | 76, 480 | 11, 520 | 22, 097 | 2, 921 | 35, 939 | 55, 802 |
| Apr.–June | 112, 530 | 20, 121 | 30, 295 | 4, 014 | 49, 660 | 77, 577 | 40, 712 | 8, 447 | 9, 205 | 1, 079 | 17, 638 | 20, 168 | 71, 818 | 11, 674 | 21, 090 | 2, 935 | 32, 022 | 57, 409 |
| July–Sept. | 94, 873 | 19, 963 | 25, 826 | 3, 795 | 38, 660 | 80, 816 | 34, 990 | 8, 065 | 7, 729 | 963 | 14, 854 | 21, 825 | 59, 883 | 11, 898 | 18, 097 | 2, 832 | 23, 806 | 58, 991 |
| Oct.–Dec. | 85, 105 | 18, 037 | 23, 590 | 3, 361 | 34, 800 | 62, 185 | 34, 317 | 7, 931 | 7, 514 | 925 | 14, 904 | 20, 025 | 50, 788 | 10, 106 | 16, 076 | 2, 436 | 19, 896 | 42, 160 |
| *1945* | | | | | | | | | | | | | | | | | | |
| Jan.–Mar. | 90, 554 | 20, 251 | 26, 084 | 3, 543 | 35, 306 | 71, 467 | 35, 234 | 8, 383 | 8, 038 | 953 | 14, 689 | 19, 553 | 55, 320 | 11, 868 | 18, 046 | 2, 590 | 20, 617 | 51, 914 |
| Apr.–June | 97, 617 | 20, 398 | 29, 430 | 4, 031 | 37, 709 | 79, 226 | 35, 505 | 7, 942 | 7, 757 | 869 | 15, 389 | 20, 182 | 62, 112 | 12, 456 | 21, 673 | 3, 162 | 22, 320 | 59, 044 |
| July–Sept. | 87, 664 | 19, 685 | 26, 953 | 3, 453 | 32, 485 | 83, 676 | 31, 029 | 6, 919 | 6, 905 | 756 | 13, 474 | 22, 071 | 56, 635 | 12, 766 | 20, 048 | 2, 697 | 19, 011 | 61, 605 |
| Oct.–Dec. | 83, 376 | 21, 187 | 25, 073 | 3, 187 | 29, 518 | 84, 216 | 29, 093 | 7, 245 | 6, 547 | 725 | 12, 040 | 23, 477 | 54, 283 | 13, 942 | 18, 526 | 2, 462 | 17, 478 | 60, 739 |
| *1946* | | | | | | | | | | | | | | | | | | |
| Jan.–Mar. | 99, 151 | 27, 031 | 29, 635 | 3, 683 | 33, 552 | 100, 176 | 34, 113 | 8, 883 | 7, 930 | 886 | 13, 720 | 25, 965 | 65, 038 | 18, 148 | 21, 705 | 2, 797 | 19, 832 | 74, 211 |
| Apr.–June | 100, 711 | 28, 319 | 28, 991 | 3, 858 | 33, 525 | 104, 526 | 36, 444 | 9, 368 | 8, 379 | 950 | 14, 577 | 25, 363 | 64, 267 | 18, 951 | 20, 612 | 2, 908 | 18, 948 | 79, 163 |
| July–Sept. | 99, 824 | 29, 190 | 28, 169 | 3, 473 | 31, 985 | 112, 308 | 37, 342 | 9, 243 | 8, 366 | 877 | 14, 246 | 27, 573 | 62, 482 | 19, 947 | 19, 803 | 2, 596 | 17, 739 | 84, 735 |
| Oct.–Dec. | 93, 885 | 27, 422 | 26, 967 | 3, 453 | 29, 774 | 105, 823 | 36, 255 | 8, 658 | 8, 159 | 939 | 14, 107 | 25, 058 | 57, 630 | 18, 764 | 18, 808 | 2, 514 | 15, 667 | 80, 765 |
| *1947* | | | | | | | | | | | | | | | | | | |
| Jan.–Mar. | 94, 731 | 26, 559 | 28, 030 | 3, 589 | 30, 555 | 96, 073 | 35, 526 | 7, 746 | 7, 930 | 928 | 14, 443 | 16, 710 | 59, 205 | 18, 813 | 20, 100 | 2, 661 | 16, 112 | 79, 363 |
| Apr.–June | 93, 985 | 24, 601 | 28, 488 | 3, 612 | 32, 082 | 95, 589 | 34, 558 | 7, 062 | 7, 970 | 794 | 14, 883 | 14, 989 | 59, 427 | 17, 539 | 20, 518 | 2, 818 | 17, 199 | 80, 600 |
| July–Sept. | 90, 762 | 22, 608 | 26, 999 | 3, 480 | 32, 037 | 104, 192 | 31, 178 | 6, 004 | 7, 046 | 691 | 12, 709 | 16, 296 | 59, 584 | 16, 604 | 19, 953 | 2, 789 | 19, 328 | 87, 896 |
| Oct.–Dec. | 85, 381 | 20, 920 | 24, 682 | 3, 111 | 29, 759 | 94, 157 | 33, 810 | 5, 975 | 7, 396 | 771 | 13, 774 | 16, 945 | 51, 571 | 14, 945 | 17, 286 | 2, 340 | 15, 985 | 77, 212 |

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *1948* | | | | | | | | | | | | | | | | | | | |
| Jan.-Mar. | 83, 532 | 19, 747 | 23, 919 | 3, 668 | 30, 778 | 85, 028 | 30, 323 | 5, 542 | 6, 779 | 781 | 12, 653 | 15, 075 | 53, 209 | 14, 205 | 17, 140 | 2, 887 | 18, 125 | 69, 953 |
| Apr.-June | 86, 317 | 18, 153 | 25, 799 | 4, 251 | 33, 364 | 88, 790 | 29, 911 | 5, 081 | 6, 939 | 785 | 13, 279 | 13, 953 | 56, 406 | 13, 072 | 18, 860 | 3, 466 | 20, 085 | 74, 837 |
| July-Sept | 80, 659 | 16, 507 | 23, 587 | 3, 891 | 31, 951 | 97, 135 | 29, 040 | 4, 857 | 6, 677 | 829 | 12, 849 | 16, 540 | 51, 619 | 11, 650 | 16, 910 | 3, 062 | 19, 102 | 80, 595 |
| Oct.-Dec | 71, 743 | 14, 529 | 21, 082 | 3. 560 | 29, 104 | 85, 190 | 27, 395 | 4, 715 | 6, 586 | 785 | 12, 538 | 16, 145 | 44, 348 | 9, 814 | 14, 496 | 2, 715 | 16, 566 | 69, 045 |
| *1949* | | | | | | | | | | | | | | | | | | | |
| Jan.-Mar | 73, 091 | 12, 980 | 21, 951 | 4, 023 | 30, 676 | 80, 361 | 24, 783 | 3, 956 | 5, 815 | 708 | 11, 504 | 14, 520 | 48, 308 | 9, 024 | 16, 136 | 3, 315 | 19, 172 | 65, 841 |
| Apr.-June | 71, 091 | 10, 923 | 21, 385 | 4, 253 | 32, 161 | 80, 211 | 24, 212 | 3, 251 | 6, 016 | 823 | 12, 284 | 11, 521 | 46, 879 | 7, 672 | 15, 369 | 3, 430 | 19, 877 | 68, 690 |
| July-Sept | 62, 183 | 10, 138 | 18, 584 | 3, 546 | 28, 023 | 91, 057 | 20, 350 | 2, 904 | 5, 119 | 786 | 10, 320 | 12, 981 | 41, 833 | 7, 234 | 13, 465 | 2, 760 | 17, 703 | 78, 076 |
| Oct.-Dec | 58, 088 | 8, 653 | 16, 629 | 3, 454 | 27, 813 | 76, 746 | 20, 735 | 2, 898 | 5, 116 | 668 | 11, 032 | 11, 236 | 37, 353 | 5, 755 | 11, 513 | 2, 786 | 16, 781 | 65, 510 |
| *1950* | | | | | | | | | | | | | | | | | | | |
| Jan.-Mar | 58, 436 | 7, 687 | 16, 999 | 3, 690 | 28, 713 | 73, 504 | 19, 804 | 2, 582 | 5, 103 | 627 | 10, 504 | 10, 123 | 38, 632 | 5, 105 | 11, 896 | 3, 063 | 18, 209 | 63, 381 |
| Apr.-June | 60, 007 | 6. 394 | 16, 200 | 4, 374 | 30, 832 | 72, 284 | 20, 367 | 2, 098 | 4, 914 | 646 | 10, 949 | 9, 828 | 39, 640 | 4, 296 | 11, 286 | 3, 728 | 19, 883 | 62, 456 |
| July-Sept | 54, 608 | 5, 523 | 14, 720 | 3. 579 | 28, 994 | 81, 437 | 18, 633 | 1, 838 | 4, 317 | 671 | 10, 483 | 11, 144 | 35, 975 | 3, 685 | 10, 403 | 2, 908 | 18, 511 | 70, 293 |
| Oct.-Dec[b] | 53, 891 | 4, 944 | 14, 975 | 3, 552 | 28, 373 | 68, 307 | 19, 712 | 1, 769 | 4, 572 | 689 | 11, 114 | 10, 686 | 34, 179 | 3, 175 | 10, 403 | 2, 863 | 17, 259 | 57, 621 |

[a] Includes stage "Not stated."
[b] Provisional.

Source: PHS Form 688—FSA-PHS—Division of Venereal Disease, Office of Statistics, Apr. 27, 1951 (ML-BBM) mw.

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# The JOURNAL of VENEREAL DISEASE INFORMATION

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FEDERAL SECURITY AGENCY
Public Health Service

## Submission of Manuscripts

In order to facilitate the handling of manuscripts submitted for publication in The Journal of Venereal Disease Information, the editor requests that copy be prepared in triplicate, typewritten, double-spaced, with liberal margins. Statistical tables and charts should be set up according to the style used in the Journal, and should be presented on separate sheets, rather than within text material.

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*Chief, Division of Venereal Disease*

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# A Rapid Method for Performing Quantitative Tests for Syphilis in Large-Scale Testing Programs[1]

**Ad Harris**[2] **and H. N. Bossak**[3]

Quantitative serologic tests for syphilis have assumed a role of increasing importance in the management of the disease during the past several years. The performance of quantitative tests as a routine procedure has created certain problems associated with the time consumed in performing these tests, the personnel required, and the quantity of glassware used. These problems assume importance in those laboratories where large numbers of tests are performed, or where mass surveys are being conducted.

Osler and Widelock (*1*), in 1948, reported a quantitative method which made possible the preparation of serum dilutions directly on a microscope slide. A modification of this method has been tentatively adopted by the Subcommittee for the Development of Standard Serologic Methods of the American Public Health Association for a standard flocculation test (*2*).

The purpose of this report is to present in detail a similar procedure which was developed in this laboratory and successfully employed in a recent large-scale testing survey. Although the VDRL test (*3*) was employed in this study, the procedure outlined is applicable to similar serologic tests, for syphilis or other diseases, performed on glass slides.

It is believed that this method is of particular interest since it permits rapid quantitative testing of large numbers of specimens without altering the basic testing procedure, and since it operates with maximum economy of personnel, glassware, and equipment.

## Method

### *Preparing the Serum*

Serums are separated from clots by centrifugation and are heated at 56° C. for 30 minutes. All serums are examined when removed from the water bath and those found to contain particulate debris are centrifuged. Serums to be tested more than 4 hours after heating should be reheated at 56° C. for 10 minutes.

### *Preparing the Saline Solutions*

A buffered saline solution (pH 6.0) containing 1 percent sodium chloride used in the antigen emulsion is described in the technic for the VDRL test (*3*).

The 0.9-percent saline solution is prepared by adding the proper amount of dry sodium chloride to distilled water. This solution is used for diluting serums in the test tubes and on the slides. Aliquots of the 0.9-percent saline solution are placed in two bottles or flasks. Syringes fitted with needles, used for dropping saline onto the slide, stand in these bottles when not in use. One syringe is fitted with a 15-gage hypodermic needle which should be checked to determine that each drop of saline delivered, when the syringe is held in a vertical position, will be approximately 0.03 ml. Likewise, the second syringe, fitted with a 13-gage needle, should be checked to determine that the drop-size of saline delivered is approximately 0.04 ml.

### *Qualitative Tests*

Slide holders and slides are arranged to allow testing of serums in groups of 50. Wooden slide holders are designed to accommodate five 2- x 3-inch microscope slides, each with ten 14-mm. paraffin rings instead of the usual 12. A number, designating the first serum on each slide, is placed in the area at the lower right-hand

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[2] Assistant Director, in charge Serology Section, Venereal Disease Research Laboratory.

[3] Assistant Chief, Serology Section, Venereal Disease Research Laboratory.

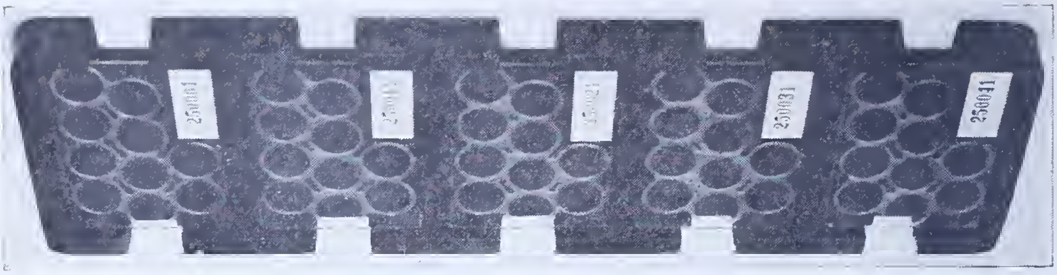


Figure 1.—Slides and slide holder for qualitative tests.

corner of the slide. This may be accomplished with prenumbered paper labels or with a wax pencil. Serums, in 0.05-ml. quantities, are added to the slides and testing is carried out as described for the VDRL slide test (*3*). Slides and slide holder are shown in figure 1.

### *Quantitative Test*

All serums that produce positive or weakly positive reactions in the qualitative test are retested quantitatively in the following manner:

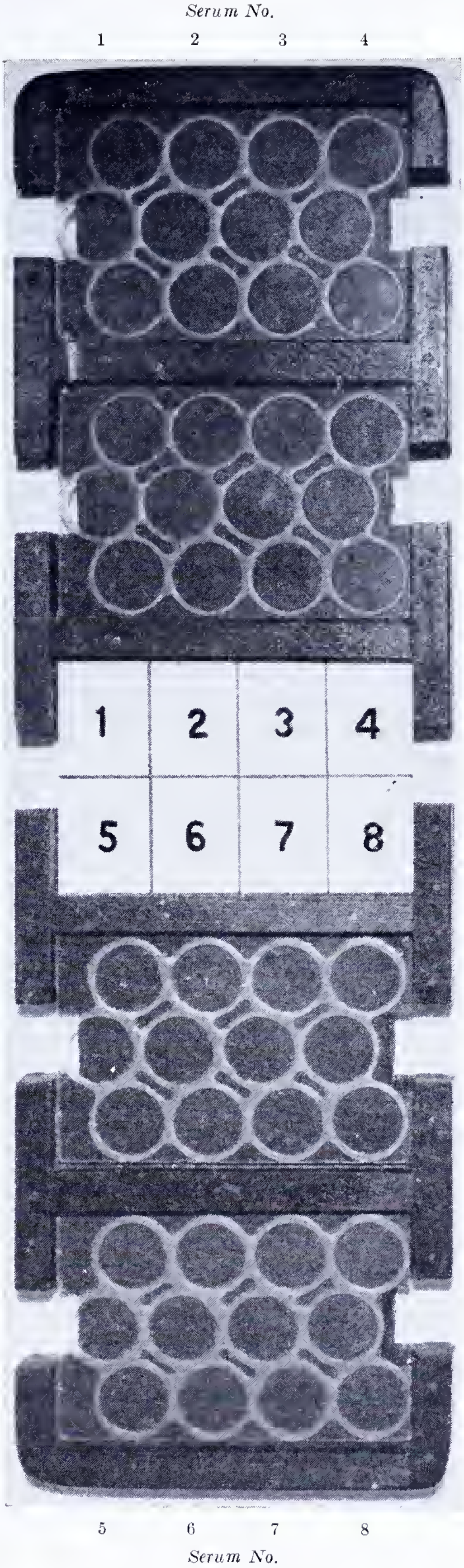
Four 2- x 3-inch glass slides with twelve 14-mm. paraffin rings are placed in a 5-place slide holder. A glass slide with two parallel strips of masking or adhesive tape is placed in the center space of the slide holder. Numbers identifying the serums to be tested (four on the two slides above the numbered slide and four on the two lower slides) are written on the adhesive strips.

A 1 : 10 dilution of each serum to be tested quantitatively is prepared by adding 0.1 ml. of the serum to 0.9 ml. of 0.9-percent saline solution using a 0.2-ml. pipette graduated in 0.01 ml. After the serum and saline are thoroughly mixed, the pipette is allowed to stand in the test tube. Using this 0.2-ml. pipette, 0.05-ml., 0.02-ml., and 0.01-ml. quantities of the 1 : 10 dilution of the first serum are pipetted into the fourth, fifth, and sixth rings, respectively. With the same pipette, 0.05-ml., 0.02-ml., and 0.01-ml. quantities of the first serum, undiluted, are pipetted into the first, second, and third ringed areas directly above the numbered slide, as illustrated in figure 2. This procedure is repeated with each serum and the accompanying 1 : 10 serum solution until each of the eight serums are pipetted onto the slides.

One drop (0.03 ml.) of 0.9-percent saline solution is added to the second and fifth rings of each serum, by vertical delivery, from a 15-gage hypodermic needle fitted to a glass syringe. One drop (0.04 ml.) of 0.9-percent saline solution is added to the third and sixth rings of all eight serums by vertical delivery from the syringe fitted with the 13-gage needle. The six mixtures of each serum are then equivalent to dilution of 1 : 1 (undiluted), 1 : 2.5, 1 : 5, 1 : 10, 1 : 25, and 1 : 50. Slides are then gently rotated by hand for about 15 seconds to mix the serum and saline. One drop (1⁄60 ml.) of antigen emulsion is added to each ring using a 22-gage needle as described in the technic for the VDRL slide flocculation test (*3*). This manner of preparing serum dilutions by adding serum and saline directly to the slides is outlined in figure 2.

Tests are completed by rotation of the slides in the manner prescribed for the VDRL slide test (*3*). Results are read microscopically and the highest serum dilution giving a positive reaction (not weakly positive) is reported as the reactivity end point of the serum, e. g., positive—1 : 25 dilution, or, positive—25 dils.

If all serum dilutions tested give positive reactions, then a 1 : 100 dilution of that serum is prepared by diluting 0.1 ml. of the 1 : 10 serum dilution with 0.9 ml. of 0.9-percent saline solution. By pipetting 0.5-ml., 0.02-ml., and 0.01-ml. amounts of this 1 : 100 serum dilution and adding enough saline to each ring to bring the



| Ring No. | Serum dilutions | Serum (ml.) | Saline (ml.) |
|---|---|---|---|
| 1 | 1:1 (*undiluted*) | 0.05 | 0 |
| 2 | 1:2.5 | .02 | .03 |
| 3 | 1:5 | .01 | .04 |
| 4 | 1:10 | (*diluted 1:10*)<br>.05 | 0 |
| 5 | 1:25 | .02 | .03 |
| 6 | 1:50 | .01 | .04 |
| 1 | 1:1 (*undiluted*) | .05 | |
| 2 | 1:2.5 | .02 | .03 |
| 3 | 1:5 | .01 | .04 |
| 4 | 1:10 | (*diluted 1:10*)<br>.05 | 0 |
| 5 | 1:25 | .02 | .03 |
| 6 | 1:50 | .01 | .04 |

FIGURE 2.—Slides and slide holder for quantitative tests.

volumes to 0.05-ml., serum dilutions of 1 : 100, 1 : 250, and 1 : 500 are prepared. These dilutions of serum are then tested exactly as are the lower dilutions. The highest dilution in which a positive reaction (not weakly positive) is obtained is reported as the reactivity end point.

Few serums will react positively in dilutions greater than 1 : 500. However, when necessary, higher dilutions of serum may be prepared for testing by diluting the 1 : 100 dilution of serum with 9 parts of 0.9-percent saline solution, pipetting 0.05-ml., 0.02-ml., and 0.01-ml. quantities and testing as with the other dilutions. These quantities will then represent 1 : 1,000, 1 : 2,500, and 1 : 5,000 serum dilutions.

## Discussion

The manner of conducting quantitative serologic tests for syphilis on a slide, as described in this report, has proved to be more efficient in regard to the man-hours of technician time used and the amount of glassware employed than were the older methods requiring preparation of a series of serum-saline dilutions in test tubes. Serum and saline quantities are delivered directly to the slide and, in most instances, the preparation of only one serum dilution in the test tube is required since only a small percentage of positive serums will react in dilutions greater than 1 : 50. Testing is more pleasant to the technical worker since the blowing in and out necessary to preparing a series of serum-saline dilutions in test tubes is avoided. Since most of the measurements of serum and saline are direct, a greater degree of reproducibility can also be expected from this type of quantitative testing.

The method described in this article was used for qualitative and quantitative testing of approximately 228,000 blood specimens received at the Venereal Disease Research Laboratory during a multiphasic screen program conducted by the Georgia Department of Public Health during the 3-month period April through June 1950. This procedure is also being successfully used in a large testing laboratory that routinely quantitates all positive serums in serologic tests for syphilis. The manner of adding serum and saline to the slides will not interfere with the performance of the several serologic tests for syphilis that are performed on glass slides, since this method for quantitative testing of serums will lend itself to any of these procedures.

## Summary

A rapid method for performing quantitative slide tests for syphilis in large-scale testing programs is described.

The applicability of this method for quantitating reactive serums in serologic tests for syphilis, or for other diseases, is discussed.

## References

1. Osler, A. G.; Widelock, D.: A rapid slide method for the titration of antibodies in syphilitic serum. J. Ven. Dis. Inform., 29 : 239–242, August 1948.
2. Personal communications from committee members.
3. Manual of Serologic Tests for Syphilis. Supplement No. 22 to J. Ven. Dis. Inform., 1949. Pp. 109–113.

# Local Herxheimer Reaction Following Application of Penicillin Solution to Syphilitic Chancres

J. C. Cutler, M. D.;[1] R. D. Wright, M. D.;[2] R. C. Arnold, M. D.;[3] S. Levitan, M. D.[4]

The purpose of this paper is to describe a phenomenon which has been called the local Herxheimer reaction observed following application of a solution of aqueous penicillin to darkfield-positive lesions of primary syphilis.

The Herxheimer reaction is a complex of symptoms and signs found in the syphilitic patient who receives a potent spirocheticidal drug such as arsenic or penicillin. The manifestation depends upon the stage of the disease and the lesions of the patient. In primary and secondary syphilis, the manifestations are found in a feeling of malaise and discomfort, a chill and fever, edema, swelling and discomfort—even pain—in the primary lesion, or a brightening of the secondary lesions. Any combination of these manifestations may be found, and numerous others, either subjective or objective, have been reported. As yet, there is no agreement as to the mechanism of the reaction. It has been suggested that the manifestations are a result of the liberation of the products of spirochetal disintegration subsequent to destruction by the therapeutic agent; that the reaction may represent a type of sensitivity reaction subsequent to liberation of large quantities of spirochetal material into a tissue already sensitized by the presence of the organism. Other theories have been offered but will not be discussed here.

## Reaction to Penicillin

The reaction at the site of the primary chancre is a dramatic one. Often within 2 hours of the first injection of aqueous penicillin the primary lesion will begin to become edematous. There is exudation of serum with a clearer demarcation of the borders of the lesion, and, not infrequently, the patient will complain of local pain and discomfort at the site of the lesion. In the uncircumcised patient, particularly, the edema may become so pronounced that he is acutely uncomfortable and is unable to retract the foreskin. Microscopic studies have shown increased leucocytic infiltration at the site of the lesion in addition to the edema. Moore et al. (*1*) report a Herxheimer reaction in 39 percent of the patients with seronegative primary syphilis and in 43 percent of those having seropositive primary syphilis.

It was felt that a study of the effect of locally applied penicillin might add to an understanding of the mechanism of the Herxheimer reaction since it had been shown that penicillin has, in vitro, the property of being toxic for the *Treponema pallidum*, bringing about death of the organism.

## Method of Local Application of Penicillin

In order to study the effects of local application, the following procedure was carried out. Male patients with darkfield-positive penile ulcers either on the glans penis, on the inner surface of the foreskin, or on both, and having a long prepuce which could be pulled forward forming a cup to hold a penicillin solution in contact with the ulcers were chosen. No effort was made to select patients on the basis of the serologic reaction or to exclude patients having secondary lesions of syphilis. A solution of aqueous penicillin containing 20,000 units per cubic centimeter in distilled water was used. At this time, 1946, various lots of penicillin, either amorphous or purified to contain varying quantities of penicillin G, were used. Only the sodium salt of penicillin was used.

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[3] Medical Director, Chief, Technical Services Branch, National Heart Institute, U. S. Public Health Service.

[4] Medical Director, United Nations International Children's Emergency Fund, World Health Organization, Yaws and Syphilis Program, Haiti.

The patient was told to use his fingers to draw the foreskin forward so as to cup it, and 1 cc. of the penicillin solution was placed in the cup. Under scrutiny of the physician, the solution was held in contact with the lesions in the cup for 15 minutes. Then the patient was permitted to release the penis, allowing the solution to escape. The patient was observed at irregular intervals during the next 24 hours or more. At the conclusion of the period of observation, sometimes as long as 6 or 7 days during which the patient received no further local applications and no systemic antisyphilitic therapy, the patient was put under routine parenteral penicillin treatment.

## Observations

It was observed that most patients showed certain local reactions following application, which were interpreted as local Herxheimer reactions. Within an hour in some patients, the individual began to complain of slight local discomfort, slight pain. Over a longer period of time, up to 6 or 8 hours, moderate discomfort or local pain might develop. Within several hours, most patients began to develop edema of the lesion and the surrounding tissues; this was particularly marked when the ulcer was found in the loose tissue of the foreskin, and in some cases progressed to such an extent that it was impossible to retract the foreskin. The lesions showed increased local exudation, and usually the borders became more sharply demarcated. Within 24 hours the phenomenon would subside so that the ulcer resumed the pretreatment appearance with the exception that it usually seemed cleaner. No *T. pallidum* could be found upon darkfield examination, and, in the patients followed by daily examination, it was often 5 or 6 days before the organisms could again be demonstrated in the lesions. Upon institution of parenteral therapy, it was noted that the patients might again show the local signs and symptoms in addition to the systemic manifestations of the reaction such as chills, fever, malaise, etc.

## References

1. Moore, J. E., Jr.; Farmer, T. W.; Hoekenga, M. T.: Penicillin and the Jarisch-Herxheimer reaction in early, cardiovascular, and neurosyphilis. Tr. A. Am. Physicians, Philadelphia, 61: 176–183, 1948.

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# Congenital Syphilis. An Approach to the Problem Via the Birth Certificate [1]

R. W. Ball, M. D.[2]

While the problem of congenital syphilis has been of medical and public health concern for years, the past several months have seen considerable national attention focused upon it. Programs advocated for its control have been many and varied, but most have been centered around case-finding activities. It should be borne in mind, however, that the ultimate solution lies in the diagnosis and treatment of the syphilitic mother during pregnancy. Many States have enacted legislation requiring serologic tests for syphilis during pregnancy. Despite this, cases of congenital syphilis in persons of all ages are treated annually. In 1946, South Carolina passed a law requiring that every expectant mother have a blood test at the time of her first obstetric examination; yet, during the first 6 months of 1950, 34 patients under 4 years of age who were born in South Carolina were admitted to the Rapid Treatment Center for treatment of congenital syphilis.

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[1] Presented at Venereal Disease Control Seminars at Hot Springs, Ark., September 27, 1950; Roanoke, Va., December 5, 1950; and Cleveland, Ohio, February 20, 1951.

[2] Director, Division of Venereal Disease Control, South Carolina State Board of Health, Columbia, S. C.

## The Birth Certificate

Before deciding upon the most appropriate method of controlling congenital syphilis, it is logical first to determine the extent to which prenatal blood testing is being done in the area or areas under study. If a question appears on the birth certificate form as to whether or not the mother's blood was tested for syphilis before the baby was born, and if, in every case, the attending physician or midwife writes in a reply, tabulation of replies should reveal the status of prenatal blood testing. A specific question pertaining to the prenatal blood test appears on the South Carolina certificate of live birth, as well as on the stillbirth certificate. This question has appeared on the South Carolina forms since 1945, 1 year prior to the State's adoption of the prenatal law.

The use of the birth certificate as herein described is not intended to serve as a control measure, in itself, but rather as an approach to the problem, the data compiled serving to measure the completeness and accuracy of reporting prenatal blood tests, and serving also to designate the areas, groups, and individuals that should receive special attention. Analysis of the data should reveal failures to perform the blood test, as well as failures to report it. With this information on hand, a sound and systematic basis for remedial measures could be instituted more easily.

## Study of the Birth Certificate

### *Order of Study*

A study was made of over 100,000 South Carolina birth certificates filed for the calendar years 1948 and 1949, and has subsequently been extended into 1950.

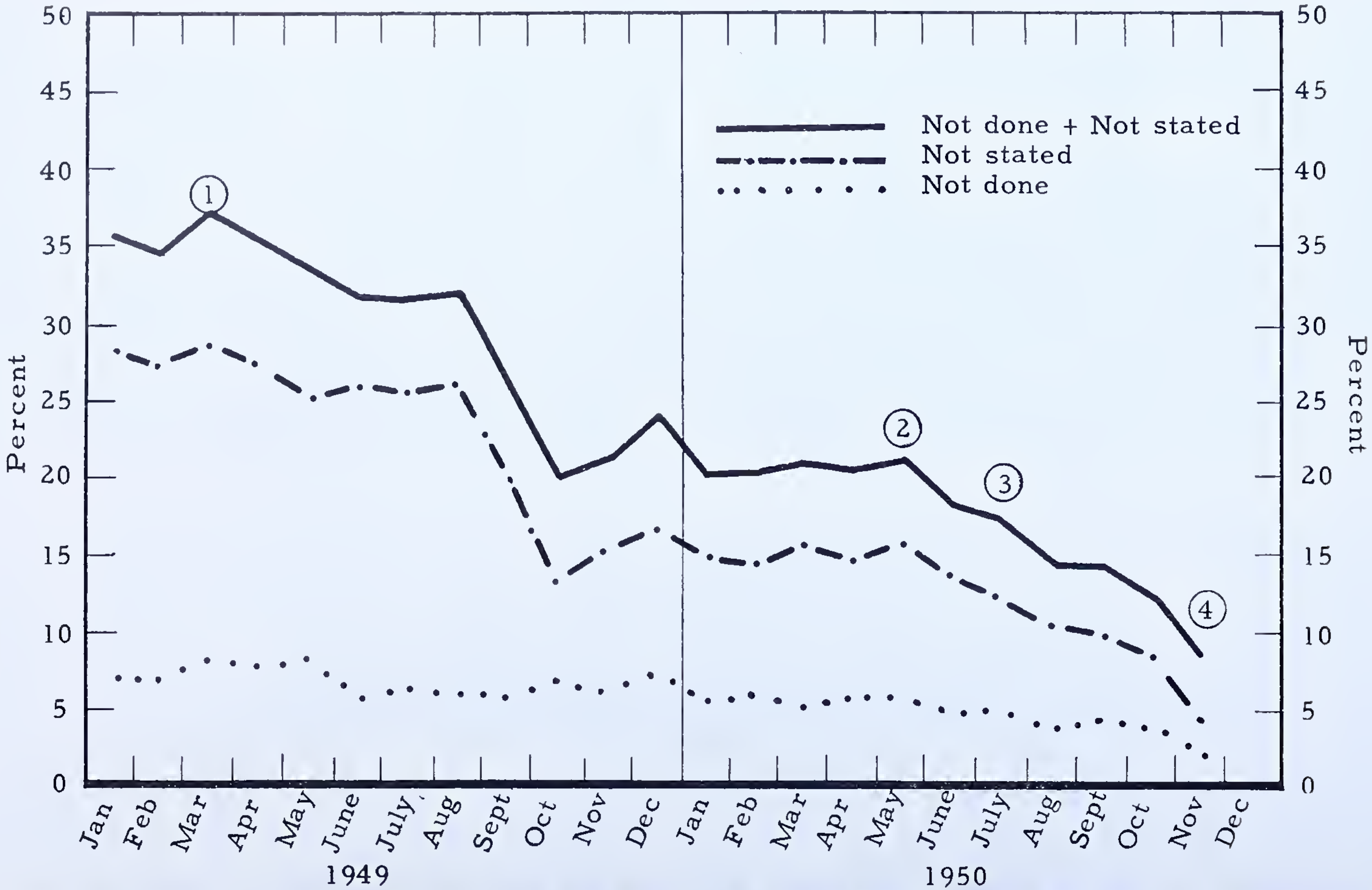
The preliminary study of birth certificates which were filed during each of the 3 years revealed the following information:

1. Percentage of birth certificates on which prenatal blood testing of the mother was recorded
   (*a*) in the entire State
   (*b*) in each county
2. Comparison of percentage of birth certificates on which prenatal blood testing was recorded when mother was attended at delivery
   (*a*) by a physician in a hospital
   (*b*) by a physician at home
   (*c*) by a midwife at home
3. Comparison of percentage of birth certificates on which prenatal blood testing was recorded when baby was
   (*a*) born alive or stillborn
   (*b*) born of white or colored parents
   (*c*) born in rural or urban locality
4. Complete listing of individual birth certificates on which prenatal blood test was not recorded.
5. Progress in percentage of birth certificates on which performance of prenatal blood test is recorded.

### *Findings*

The information obtained from the preliminary study of the birth certificates filed for the calendar year 1948 indicated that in a high percentage of the cases (37 percent), the prenatal blood test either was not performed or was not reported. This was true of cases under the care of physicians and midwives.

These findings were more or less consistent even when live births were compared with stillbirths, urban births with rural births, and white births with colored births. Birth certificates signed by physicians, whether for hospital or home deliveries, showed a much higher percentage of delinquent certificates (42.4 percent) than those signed by midwives (24.9 percent). (For the purposes of this paper the term "delinquent" is used to describe birth certificates on which the question pertaining to prenatal blood testing either



① Prenatal law mailed to physicians and county health departments.
② Report made to South Carolina Medical Association.
③ Personal visits to hospitals and county health departments.
④ Letter to physicians regarding certificates of home births.

FIGURE 1.—Percentage of all birth certificates filed in 1949 and 1950 on which no prenatal blood test was recorded.

was not answered or was answered in the negative.) An analysis of the data by counties indicated the areas from which the greatest percentage of delinquent certificates were received. Birth certificates recording hospital deliveries in 1949 showed a higher percentage of delinquent certificates (34.7 percent) than those from home deliveries (23.5 percent).

### *Reasons for Delinquent Certificates*

In order to determine, if possible, the reason for the apparent State-wide laxness regarding the prenatal blood test, listings by counties of the individual certificates were then made under three headings and set up in ledger form.

1. *Hospital deliveries.*—For the purposes of this study, the following data were listed from each of 10,995 delinquent certificates: volume number, certificate number, maiden name of mother, surname of baby, code number of county, date of birth, race, sex, name of hospital, and name of physician in attendance. A comparison of the handwriting in which each certificate was prepared and the physician's signature was noted, as well as whether or not the certificate showed that a prenatal blood test of the mother had been performed. A vast majority of the birth certificates either had been typed or were made out in handwriting different from that of the signature. It was apparent, therefore, that many of the certificates were being prepared for the physician's signature by other persons, probably by hospital personnel who failed to answer the question on prenatal blood testing before presenting the certificate to the physician for signature. This lead to the assumption that the prenatal blood test had been performed in many cases in which it was not recorded on the certificate. This assumption was confirmed by personal visits of inquiry to the hospitals.

2. *Home deliveries by midwives.*—Comparable data were then compiled from the delinquent birth certificates submitted by midwives. Many of these certificates were found to have been written on obsolete forms of the South Carolina birth certificate, forms in use prior to 1945 when the question relative to prenatal blood testing was introduced. Many others had been made out for the midwife by the local registrar, as seen by examining the handwriting. Some were signed by midwives residing across the State line and not familiar, perhaps, with the South Carolina prenatal blood-testing law. Some bore no signature whatsoever.

3. *Home deliveries by physicians.*—Of 9,775 certificates of birth filed by physicians on home deliveries, over 4,000 showed no record of a prenatal serologic test for syphilis, either because the test was not performed, or, if performed, was not recorded. These delinquent certificates were filed by 472 physicians.

### Practical Application and Use of Data

1. In March 1949, 5 months before the preliminary study was started, a mimeographed copy of the prenatal law was mailed to every county health department in the State, and also to every physician in South Carolina whose name was listed at the State Board of Health. County health departments have reported subsequently that physicians who do not routinely blood test their prenatal patients are now referring many of them to local health departments for such service.

2. On May 15, 1950, a preliminary report, entitled "Congenital Syphilis and the Prenatal Blood Test," consisting of facts and figures derived from the study of birth certificates, was presented to the Council of the South Carolina Medical Association at its annual meeting at Myrtle Beach, and on May 17, 1950, it was presented at the open meeting of the Association as part of the scientific program. This resulted in presentation of the substance of the report by the councilors of each district to many of the local medical societies, and also set the machinery in motion for routing all birth certificates through county health departments for inspection, before forwarding them to the central office of the State Board of Health.

3. After the Myrtle Beach meeting, pertinent facts in the report were con-

veyed to public health personnel at district meetings, and also to midwives who attended State midwife institutes.

4. A mimeographed reprint of the preliminary report was mailed to every county health department in the State, and additional copies were sent to key personnel.

5. Between July and December 1950, after data from birth certificates of hospital and home deliveries had been analyzed, staff members of the State department of health began a personal tour of all counties for the purpose of enlisting the cooperation of the 80 hospitals concerned, as well as the 46 county health departments, in enforcing the prenatal blood test law, and in recording without fail on the birth certificate whether or not the test was performed. To date, all of the county health departments and practically all of the hospitals have been visited. The wholehearted cooperation of everyone concerned has been most gratifying. At each hospital, the superintendent and/or the chief of staff were interviewed and apprised of the facts which had become apparent from analysis of birth certificate data, and their cooperation was requested in carrying out control measures by the following procedures:

(*a*) Obtaining and recording information relative to the prenatal blood test before presenting the birth certificate to the physician for signature.

(*b*) Presenting to the medical staff of the hospital the importance (legal as well as medical) of the prenatal blood test and the importance of recording its performance on the birth certificate.

(*c*) Posting on the hospital bulletin board and in the doctors' lounge adjoining or near the delivery room a copy of the prenatal law.

(*d*) Having a serologic test for syphilis performed upon every obstetric patient at the time of admission, or a "cord blood" in lieu thereof.

6. Visits to all county health departments have been made in connection with delinquent midwife certificates. Each county health department was presented with a duplicate listing of the delinquent midwife certificates for that county, and the following recommendations were made:

(*a*) That the records of the county health department be checked to determine in each instance whether or not a blood test actually had been done, but had not been recorded on the birth certificate.

(*b*) That the midwife in question be summoned to the county health department to explain why the blood test had not been performed on a particular patient, or why, if performed, the information had not been recorded on the birth certificate.

(*c*) That the birth certificate forms in the possession of all midwives and local registrars be inspected, and that any obsolete ones be replaced with the newer forms.

(*d*) That registrars receive complete instructions regarding the legal requirements concerning checking birth certificates for accuracy and completeness before accepting them.

(*e*) That the midwives be required to bring in for blood testing all patients attended in 1949 on whom the prenatal blood test had not been performed.

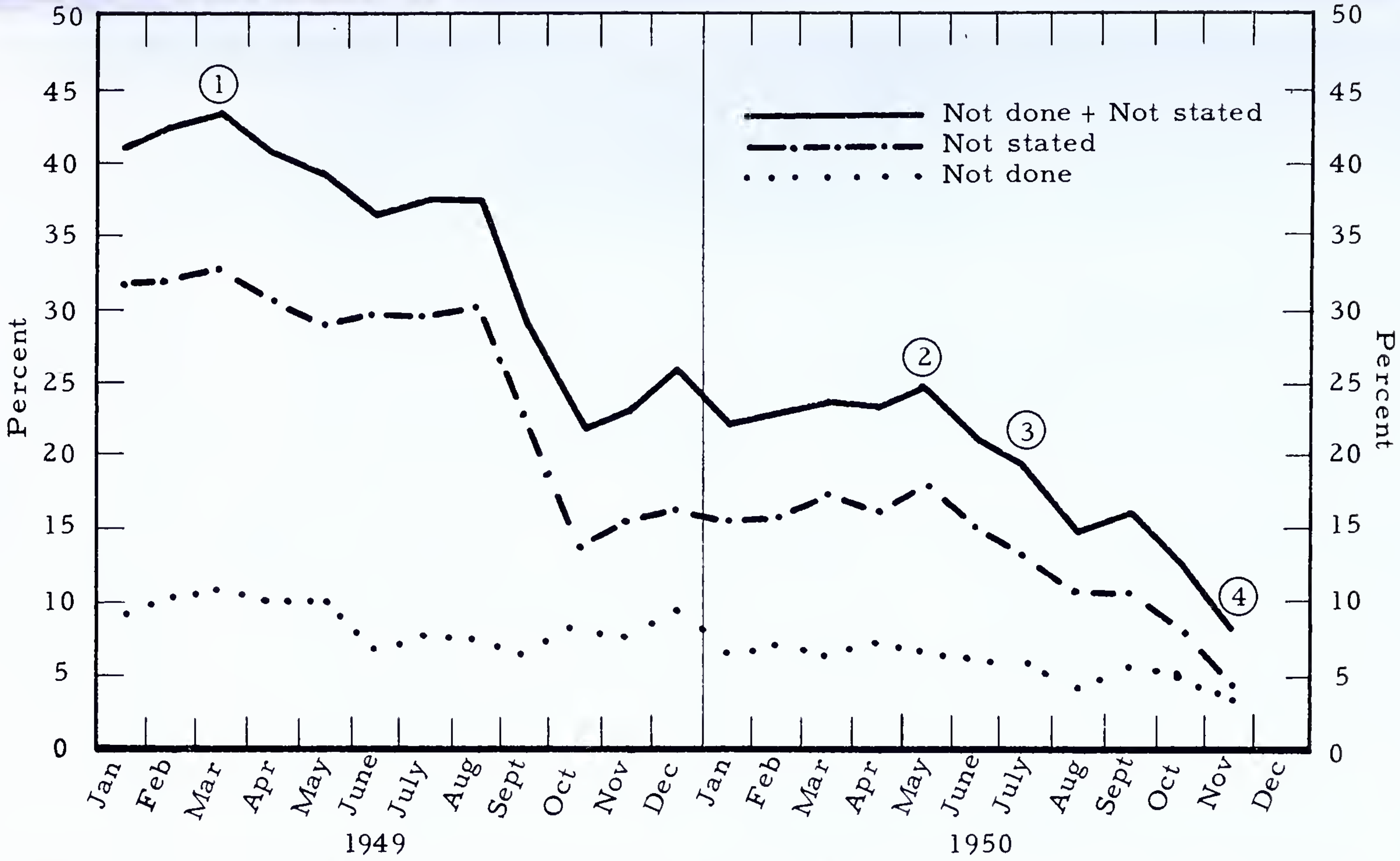
(*f*) That all mothers thus found to have a positive blood test be treated and that the names and addresses of their familial contacts be obtained.

(*g*) That epidemiologic report forms be made up for each familial contact and be followed through as with any other contacts.

(*h*) That a considerably greater amount of emphasis be placed upon compliance with the State prenatal blood-testing law.

(*i*) That a repeat blood test in the third trimester of pregnancy become routine.

7. In November 1950, each physician from whom delinquent birth certificates had been received during 1949 was sent a listing of them, by registered mail, together with a copy of the prenatal blood-testing law and an extract from the Public Health Laws of South Carolina



① Prenatal law mailed to physicians and county health departments.
② Report made to South Carolina Medical Association.
③ Personal visits to hospitals and county health departments.
④ Letter to physicians regarding certificates of home births.

FIGURE 2.—Percentage of birth certificates signed by doctors during 1949 and 1950 on which no prenatal blood test was recorded.

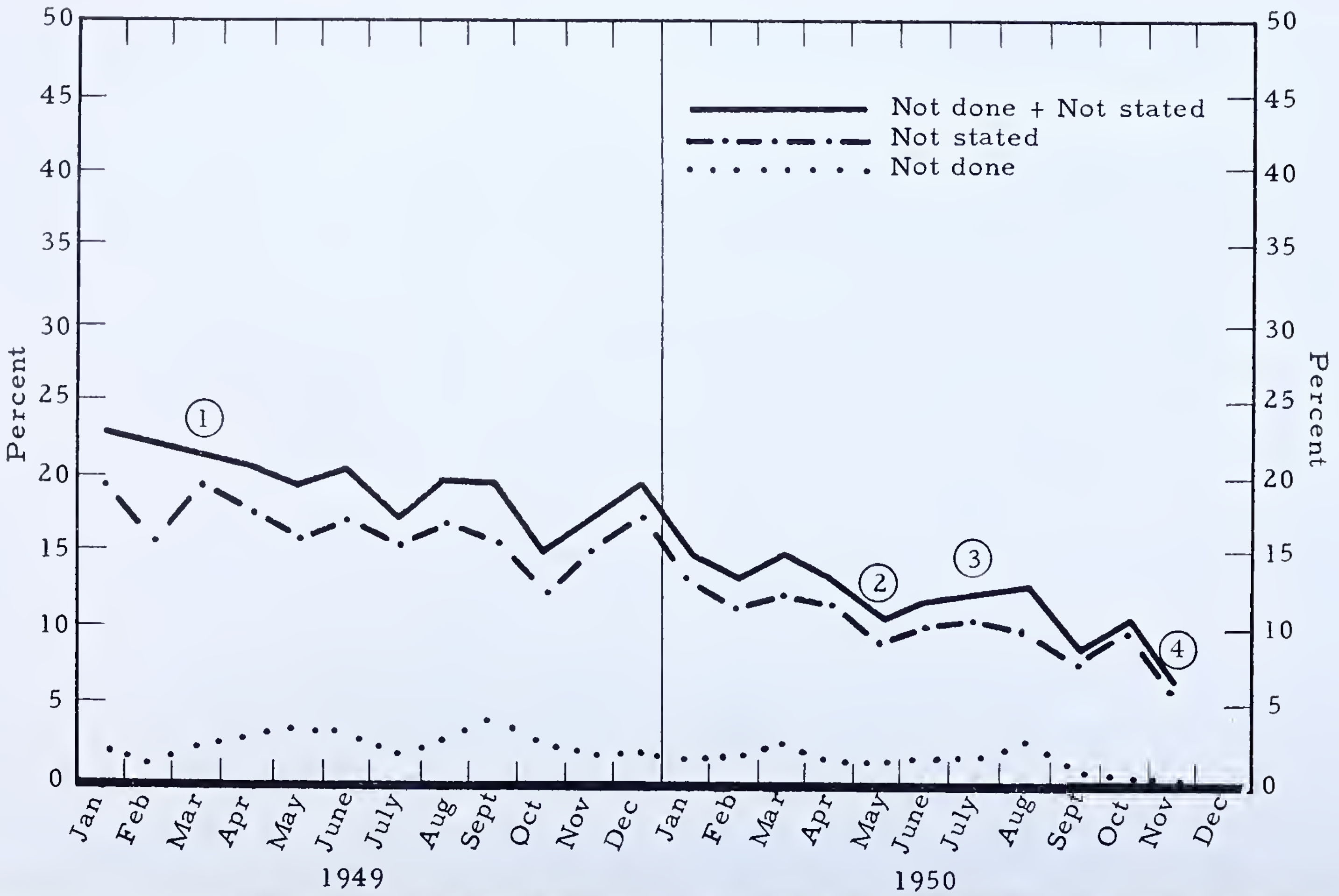


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FIGURE 3.—Percentage of birth certificates signed by midwices during 1949 and 1950 on which no prenatal blood test was recorded.

pertaining to vital statistics. No replies were requested, but to date 132 of the 472 physicians whom we had notified in this way have written letters of explanation, and some have telephoned. Many physicians who had not stated on the birth certificate whether or not the prenatal blood test had been performed sent laboratory reports on each patient in question to show that the blood test actually had been done, but had not been recorded on the birth certificate. In cases in which the question relating to performance of the prenatal blood test had been answered "not done," the majority proved to have been emergency cases in which the patient had received no prenatal care. One or two physicians volunteered to recall certain patients who had not had the prenatal blood test in order to perform postnatal serologic tests for syphilis. Some physicians decided to perform "cord bloods" on all emergency patients.

## Results

Copies of the prenatal-blood-test law were mailed during March 1949 to all county health departments and to all physicians whose names were listed at the State health department. Immediately thereafter a marked decline in the percentage of delinquent birth certificates from both physicians and midwives was seen. This decline has continued, and has been accelerated each time a new step has been taken toward securing 100-percent performance and reporting of the prenatal blood test (figs. 1, 2, 3). A marked improvement has resulted in the percentage of prenatal blood tests being performed, and in reporting them on the birth certificate.

As previously stated, the majority of cases in which it was stated that the prenatal blood test had not been performed have been shown to be emergency cases. It is apparent, therefore, that even now a large number of pregnant women do not obtain the services of a physician or midwife until time for delivery.

The information contained in this report has been officially forwarded to the Division of Maternal and Child Health and the Division of Public Health Education of the South Carolina State Board of Health, with a view to formulation of a joint plan for comprehensive education of the lay public with regard to the importance of prenatal care of pregnant women.

## Conclusions

1. In conjunction with other activities directed toward the control of congenital syphilis, a study of birth certificates with special attention to reporting the performance of the prenatal blood test, and subsequent action based upon findings, constitutes an approach not previously employed in South Carolina.
2. Analysis of data from the birth certificates provides information valuable in planning present and future procedures in controlling congenital syphilis.
3. In our experience, use of data obtained from the birth certificates has proved to be one of the most effective, and certainly the least expensive, single means of bringing the problem to the attention of physicians, midwives, and public health personnel, and has been highly effective in stimulating their interest and cooperation in performing and reporting the prenatal blood test.

# Contact Interviewing of Patients With Early Syphilis [1]

J. Vincent Sparks, R. N.[2]; Norbert G. Rausch, M. D.[3]; and
Wendell R. Ames, M. D., M. P. H.[4]

Numerous technics for interviewing patients with early syphilis to obtain identification and location of their sexual contacts during the epidemiologically significant period have been developed and tried. The technics that have been employed have varied considerably in effectiveness. Since 1936, it has been the usual practice of full-time public health officers in New York State to try to secure contact information from all patients with syphilis of less than one year's duration. For a number of years, Dr. James H. Lade, who was until recently Director of the Bureau of Venereal Disease Control in the New York State Department of Health, has made annual evaluations of the syphilis registers throughout the State except in New York City. These annual reviews have been useful for purposes of comparison, have been a source of stimulation to local, district, and State personnel, and have furnished several points of reference which are useful in evaluating the effectiveness of various technics of contact finding. In 1948, for example, the average number of contacts named per hundred cases of early syphilis in New York State (exclusive of New York City) was 105, while in Erie County the ratio was 114 contacts per hundred cases.

The Erie County Health Department was organized in its present form and began operation on January 1, 1948. For several preceding years, the former Buffalo City Health Department, which is now an integral part of the Erie County Health Department, operated a syphilis control service. This was staffed by specialized public health nurses, in addition to the usual medical and clerical personnel. After the organization of the Erie County Health Department, emphasis was shifted from specialized services toward a generalized public health nursing service. One particular area in the center of the city of Buffalo was selected for service by the generalized public health nursing staff. Attempts were made to generalize various aspects of the venereal disease control program. Fairly intensive education of the public health nursing staff was undertaken.

During this time, however, the reported incidence of early syphilis was dropping sharply (table 1). It was soon discovered that in spite of rather intensive training and maintenance of interest, the skills which were developed by the generalized nursing staff were frequently not utilized. Furthermore, experience soon showed that the administrative structure of the local venereal disease control program did not lend itself to generalization. The convenient location of the central diagnostic clinic made it easily accessible to patients and contacts. Referring them

**Table 1.—*Reported syphilis by stage and by year of report, Buffalo, N. Y.***

| Year | Stage of syphilis | | |
|---|---|---|---|
| | Acquired | | Congenital [2] |
| | Early [1] | Other | |
| 1940 | 191 | 1, 125 | 6 |
| 1941 | 184 | 1, 440 | 5 |
| 1942 | 213 | 1, 485 | 5 |
| 1943 | 234 | 1, 718 | 9 |
| 1944 | 319 | 1, 501 | 7 |
| 1945 | 471 | 1, 036 | 9 |
| 1946 | 683 | 834 | 9 |
| 1947 | 415 | 723 | 6 |
| 1948 | 279 | 969 | 5 |
| 1949 | 174 | 798 | 0 |
| 1950 | 96 | 706 | 1 |

[1] Less than 1 year's duration.
[2] In children less than 1 year of age.

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[1] From the Erie County Health Department, Buffalo, N. Y.

[2] Venereal Disease Investigator.

[3] Acting Director, Syphilis Control Service.

[4] Deputy Commissioner, Preventable Disease Service.

**Table 2.**—***Patients with early syphilis interviewed, contacts named, and cases of early and late syphilis found among contacts, Erie County, N. Y.***

[March through August 1949 and March through August 1950]

| | 1949 | | 1950 | |
|---|---|---|---|---|
| | Total cases | Number of cases per 100 patients interviewed | Total cases | Number of cases per 100 patients interviewed |
| Patients interviewed | 113 | | 44 | |
| Contacts named | 133 | 117. 7 | 134 | 304. 5 |
| Contacts examined | 89 | 78. 8 | 83 | 188. 6 |
| Syphilis among contacts | 53 | 46. 9 | 31 | 70. 5 |
| Early syphilis | 39 | 34. 5 | 13 | 29. 6 |
| Late syphilis | 14 | 12. 4 | 18 | 40. 9 |
| Previously known | 11 | 9. 7 | 11 | 25. 0 |
| Previously unknown | 3 | 2. 7 | 7 | 15. 9 |

to the generalized nursing service resulted in lost time and lost patients. In 1949, therefore, it was decided that it would be wise to return to the former specialized pattern of handling contact interviewing and to make a single person responsible for all of this work. In accordance with this decision, arrangements were made for training one of the authors (JVS) at the contact interviewing school at the Alto Medical Center, Alto, Ga. It is not intended that the interviewing technic should be presented here. Sufficient time has elapsed, however, since instituting the new system, to permit tabulation of some results of this more intensive type of contact work (table 2).

## Results

It will be noted that the yield of named contacts per hundred patients with early syphilis became considerably greater following the adoption of the newer interviewing technic. Although the proportionate yield of cases of early syphilis among the named contacts is not greater, the proportionate yield of cases of late syphilis found is much greater, and in this late syphilis grouping, the "previously unknown" component has been increased almost six times. It is admitted that the figures presented here are small and that additional experience is necessary before definite conclusions can be drawn. Nevertheless, on the basis of the information available at the present time, it seems safe to say that adoption of a new and different interviewing technic has resulted in (1) an increase in the number of contacts named per hundred patients with early syphilis; (2) no apparent change in the rate of discovery of cases of early syphilis among these named contacts; and (3) discovery of more previously unknown cases of late syphilis per hundred patients interviewed.

## Conclusions

It is felt that in spite of the apparent failure to uncover a greater proportion of persons infected with early syphilis among named contacts, the expenditure of the additional time and effort in this newer contact interviewing technic is justified by the greater proportion of previously unknown cases of syphilis found. It is worth mentioning that as an unexpected benefit from adoption of the new technic private practitioners seem to be less reluctant to have their patients interviewed by a health department staff member. This may be because a single person in the health department is responsible for the interviewing. Fixing that responsibility on one person tends to protect the physician-patient relationship and thus to make the private practicing physician less wary of third-party interference.

# CURRENT LITERATURE

A. M. A. Arch. Dermat. & Syph., Chicago

Interdigital infectious syphilitic lesions simulating dermatophytosis. Report of ten cases. Helen Taylor Dexter. A. M. A. Arch. Dermat. & Syph., 63 : 581–585, May 1951.

Data are presented on 10 patients with interdigital secondary syphilis of the feet that simulated lesions of epidermophytosis. Some of the lesions were condylomas, but most were ulcerative forms. One case in which a Herxheimer reaction of the foot lesions occurred is described. Lesions in all patients epithelized and disappeared rapidly after penicillin therapy without any topical medication.

A. M. A. Arch. Ophth., Chicago

Ocular therapeutic principles and practical applications. Edwin B. Dunphy. A. M. A. Arch. Ophth., 44 : 797–812, Dec. 1950.

Use of the sulfonamides, antibiotics, antihistamines, and steroids of the adrenal cortex in treatment of various ocular infections, including gonorrheal conjunctivitis, during the past 15 years is reviewed.

Am. J. Digest. Dis., Berne

Non-psychogenic functional disorders of the gastrointestinal tract. Francis W. Wilson. Am. J. Digest. Dis., 18 : 137–139, Apr. 1951.

The commoner neurogenic, metabolic, and miscellaneous disorders of the gastrointestinal tract are briefly discussed. Among the neurogenic causes considered is the gastric crisis of tabes dorsalis. Almost invariably these patients have the usual signs and symptoms of tabes dorsalis in addition to their gastrointestinal manifestations, so that the diagnosis should be rarely missed if a careful history and physical examination are carried out.

Am. J. M. Sc., Philadelphia

Myocardial infarction : a study of the acute phase in 920 patients. F. Janney Smith, John W. Keyes, and Ralph M. Denham. Am. J. M. Sc., 221 : 508–521, May 1951.

A review of the clinical records of 920 patients with acute myocardial infarction is presented. These records from the Henry Ford Hospital, Detroit, Mich., cover the period from 1925 to May 1, 1949, and were selected from 2,024 cases indexed during this period as coronary thrombosis with myocardial infarction. Syphilis was found in only 1.8 percent of this series. In only one patient was it proved to be a definite etiologic factor in his illness.

Am. J. Obst. & Gynec., St. Louis

A clinical study of granuloma inguinale with a routine for the diagnosis of lesions of the vulva. Walter L. Thomas. Am. J. Obst. & Gynec., 61 : 790–800, Apr. 1951.

After a review of the etiology, diagnosis, differential diagnosis, and symptomatology, the author discusses treatment of 79 female patients with granuloma inguinale observed at Duke Hospital during a 19-year period ended January 1, 1950. Author suggests that the use of antibiotics as a specific should replace antimony compounds in the treatment of this disease.

Am. J. Ophth., Chicago

Local and systemic cortisone in ocular disease. Irving H. Leopold, James E. Purnell, Edmond J. Cannon, Charles G. Steinmetz, and P. Robb McDonald. Am. J. Ophth., 34 : 361–371, Mar. 1951.

In this clinical study, an effort was made to evaluate the use of cortisone by topical, subconjunctival, and retrobulbar administration. Results of treatment of 142 eyes by one or all of these methods are presented. No improvement was obtained in four cases of congenital syphilitic interstitial keratitis.

Am. J. Pub. Health, New York

The public health nurse's bookshelf. Dorothy Deming. Am. J. Pub. Health, 41 : 375–382, Apr. 1951.

A list of desirable books for the public health nurse's bookshelf is presented. THE JOURNAL OF VENEREAL DISEASE INFORMATION and The Control of Venereal Disease, by R. A. Vonderlehr and J. R. Heller, Jr., are recommended among others in the field of venereal disease.

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### AM. J. SYPH., GONOR. & VEN. DIS., ST. LOUIS

An evaluation of public health measures for the control of syphilis. An epidemiologic study. Joseph Earle Moore. Am. J. Syph., Gonor. & Ven. Dis., 35 : 101–134, Mar. 1951.

An evaluation depends on accurate epidemiologic figures as to morbidity and mortality. Reliable figures are not available in any country prior to 1850; however, they are available for military population groups in several countries of Western Europe and the United States in varying degrees of validity. These suggest that from 1865 to 1910 there was a decline in the incidence of syphilis. Factors contributing to the decline are discussed. Since 1910 there has been a further decline, probably attributable to modern public health control measures.

Are venereal diseases disappearing? Overall picture throughout the country. W. H. Aufranc. Am. J. Syph., Gonor. & Ven. Dis., 35 : 135–137, Mar. 1951.

Many important gains have been made toward the control of syphilis, the chief public health problem in venereal disease. During the 11 years of Federal aid, syphilis mortality has been reduced 48 percent, admissions to mental institutions because of syphilis have been reduced 34 percent, infant mortality from syphilis is about one-fifth the previous rate, and the reported attack rate has decreased consistently for the past 3½ years. It is imperative that these gains continue, since the total reservoir of syphilis is estimated at 3,000,000 cases.

Syphilis and gonorrhea, New York City. A statistical review of the registration, particularly during the five-year period, 1945–1949. Godias J. Drolet. Am. J. Syph., Gonor. & Ven. Dis., 35 : 138–145, Mar. 1951.

Between 1945 and 1949, reported cases of syphilis declined from 22,690 to 20,489, while gonorrhea increased from 18,009 to 20,309. The rates are highest for the Borough of Manhattan. Late or latent cases of syphilis comprised two-thirds of the total cases in 1949. New cases are found mostly among younger women, but among male patients a substantial number are in older men. Gonorrhea cases are found more frequently among the age group of 20 to 24 years.

The effects of sex, castration, and testosterone upon the susceptibility or rabbits to experimental syphilis. Harold J. Magnuson, Barbara J. Rosenau, and Bernard G. Greenberg. Am. J. Syph., Gonor. & Ven. Dis., 35 : 146–163, Mar. 1951.

Basis of the analysis consisted of 46 male and 38 female rabbits which survived the experiment done at the Venereal Disease Experimental Laboratory, University of North Carolina. Results showed incubation period of primary lesions was shorter in the males than in females. Higher rate of lesion development in the females suggested that they may be more susceptible to the infection. Castration in either sex prolonged the incubation period and increased the animal's resistance to infection. Data suggested that testosterone interacted with other factors to produce its observed effects on the course of experimental syphilis.

Studies on the life cycle of spirochetes. V. The life cycle of the Nichols nonpathogenic *Treponema pallidum* in culture. Edward D. DeLamater, Merle Haanes, and Richter H. Wiggall. Am. J. Syph., Gonor. & Ven. Dis., 35 : 164–179, Mar. 1951.

A brief review of the literature is given. Nonpathogenic *Treponema pallidum* was grown in thioglycollate medium containing 10 percent ascitic fluid. Cultures were incubated at 37° C. and at room temperature. Observations on the forms observed in culture of the nonpathogenic Nichols strain by means of phase contrast microscopy are presented. Multispirochetal cysts were observed and photographed. Transverse fission was defined as one method of vegetative reproduction.

AM. J. SYPH. GONOR. & VEN. DIS.—CONT.

Studies on the life cycle of spirochetes. VI. The life cycle of the Nichols nonpathogenic *Treponema pallidum* in the embryonated hen's egg. Edward D. DeLamater, Merle Haanes, and Richter H. Wiggall. Am. J. Syph., Gonor. & Ven. Dis., 35 : 180–188, Mar. 1951.

The morphologic characteristics of the Nichols nonpathogenic strain as it grows in embryonated hen's egg under anaerobic conditions are described, and photographs are shown. Organisms were found to be rather short, tightly spiral, and actively motile. Stages in transverse division of the spirochetes were observed on numerous occasions. Many organisms were found to be in the act of producing buds from any point along their length. Multispirochetal cysts were not observed.

The control of syphilis. Editorial. Am. J. Syph., Gonor. & Ven. Dis., 35 : 189–190, Mar. 1951.

The present situation in the control of syphilis was summarized in a lay editorial which appeared in the Baltimore Sun on December 22, 1950. The downward trend noted in number of new cases in most States is not as low in Maryland. The number per capita is about the same as before World War II with no expectations of immediate marked declines.

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AM. PRACT. & DIGEST TREAT., PHILADELPHIA

The treatment of syphilis. Norman Epstein. Am. Pract. & Digest Treat., 2 : 317–319, Apr. 1951.

The principal changes in commercial penicillin preparations as they concern syphilis are reviewed chronologically. Dosage schedules recommended for various stages of syphilis are presented. Indications for re-treatment and criteria of follow-up observations are discussed.

The hemoglobinurias. Arthur S. Glushien. Am. Pract. & Digest Treat., 2 : 320–327, Apr. 1951.

The literature is reviewed and the salient features of the various types of hemoglobinuria are discussed. Among the conditions considered is syphilitic paroxysmal cold hemoglobinuria, occurring in certain persons with congenital or (less frequently) acquired syphilis. Patients treated adequately for syphilis with arsenicals and heavy metals usually have cessation or amelioration of hemoglobinuric attacks. Penicillin has been used in only a few of the reported cases, with inconstant results.

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BULL. NEW YORK ACAD. MED., NEW YORK

Present status of antibiotic therapy in viral and rickettsial disease. Joseph E. Smadel. Bull. New York Acad. Med., 27 : 221–231, Apr. 1951.

In this general discussion, a review of the literature on the use of chloramphenicol, aureomycin, terramycin, and penicillin in treatment of viral and rickettsial diseases, including the psittacosis-lymphogranuloma venereum group, is presented.

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CEYLON SAN. INSPECTOR, COLOMBO

Venereal disease control. D. T. S. S. Gunewardene. Ceylon San. Inspector, 11 : 19–27, No. 1.

A historical description of the venereal disease control program in Ceylon is given. Breakdown by age and occupation is given showing number treated at various clinics. Discussion is given on contact tracing, prostitution, public education, and legislation.

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CHRON. WORLD HEALTH ORGAN., GENEVA

Seventh session of executive board. Subcommittee on Serology and Laboratory Aspects, Expert Committee on Venereal Infections and Treponematoses. Chron. World Health Organ., 5 : 35–42, Feb. 1951.

Endorsement was given to the recommendations that descriptions of cardiolipin and lecithin be included in the Pharmacopoea Internationalis, and that preliminary standards for these substances be established.

WHO activities in south-east Asia. Treponematoses. Chron. World Health Organ., 5 : 42–50, Feb. 1951.

Work of the venereal disease team at Simla, India, the first to be sent into the field by WHO, is briefly described, as well as the nation-wide yaws control programs in Indonesia and Thailand.

CHRON, WORLD HEALTH ORGAN, GENEVA—CONTINUED

Thailand yaws-control project. Notes and News. Chron. World Health Organ., 5: 61–62, Feb. 1951.

Buddhist temples in the towns of Rajburi Province are being utilized for both clinics and living accommodations by WHO teams. It is estimated that four-fifths of those with yaws in the infective stage are under 18 years and women of the childbearing age.

Anti-venereal-disease commission for Rhine River area. Chron. World Health Organ., 5: 73–74, Mar. 1951.

World Health Organization Executive Board, at its seventh session, passed a resolution authorizing creation of the International Anti-Venereal-Disease Commission of the Rhine. The Commission will meet once a year and is the first intergovernmental commission of its kind to be established by the WHO.

CLIN. MED., WILMETTE

Syphilitic aortitis. Clin. Med., 58: 121–122, May 1951.

Case history of a 54-year-old male is presented. While this patient never admitted syphilitic infection and refused treatment when admitted to a hospital, an autopsy upon death revealed syphilitic aortitis and valvulitis, coronary occlusion, and arteriolar nephrosclerosis.

COLORADO HEALTH NEWS, DENVER

Kahn test reports changed. Colorado Health News, 4: 3, May 1951.

Colorado State Department of Public Health announces that quantitative Kahn test results are now being reported by dilution rather than the old Kahn unit. This change was made at the recommendation of the Public Health Service to standardize results of Kahn tests with those of other syphilis serology tests which use dilution results.

HEALTH NEWS, ALBANY

Military preventive medicine. Tom F. Whayne. Health News, 28: 3–9, 12, Mar. 1951.

In this review of the history and work of the Army Medical Department, venereal disease control among the troops is briefly discussed. A positive approach with emphasis on substitute activities, general character guidance, and the planning of recreation and leisure hours, rather than the fear motive, is stressed in present programs.

Multiple screening surveys. Editorial. Health News, 28: 2, Apr. 1951.

Multiple screening surveys have the advantages of dramatic appeal to the public and usefulness in health education. When properly conducted, surveys encourage the beneficiaries to undergo future periodic examinations. A weakness of the program is lack of a system for follow-up of cases, home care, adequate records, and the collection and analysis of data.

Multiple screening. The why's and wherefore's. A. L. Chapman. Health News, 28: 3–10, Apr. 1951.

Multiple screening programs are used to meet the need of an economical and timesaving method for finding early cases of chronic diseases. The criteria which give this program its individuality are that it should be specific, be economical to perform, and not require more than 3 minutes of a person's time while in the screening line. A description of the Richmond program is given.

INDIAN J. VEN. DIS., BOMBAY

The role of the laboratory in the modern diagnosis and treatment of venereal diseases. M. V. Krishna Murthi. Indian J. Ven. Dis., 17: 1–10, Jan.–Mar. 1951.

Recent advances in the diagnosis and treatment of venereal diseases are reviewed. In addition to the routine investigations and research which a laboratory undertakes to help the clinician in his diagnosis and follow-up of diseases, it can help select the drug of choice against any particular organism, by determining its susceptibility to the drug and estimating the amount of drug necessary to keep a sufficient antibiotic level in the blood stream.

Problems in the therapy of early syphilis. Charles R. Rein. Indian J. Ven. Dis., 17: 11–19, Jan.–Mar. 1951.

### INDIAN J. VEN. DIS. BOMBAY—CONT.

Inadequate dosage, duration of therapy, and knowledge of the chemistry of penicillin, development of absorption-delaying methods, and by-effects of penicillin therapy are discussed in this review of the possible reasons for the confusion, which appeared in early reports, regarding the proper place of penicillin in the treatment of syphilis.

Procaine penicillin in oil with aluminum monostearate (P. A. M.) in the treatment of early infectious syphilis, prenatal and infantile syphilis. F. W. Reynolds and Thorstein Guthe. Indian J. Ven. Dis., 17 : 19–28, Jan.–Mar. 1951.

On the basis of a review of the literature, the author feels that the availability of modern penicillin preparations has revolutionized the treatment of syphilis and other treponemal diseases, for it has provided the medical profession with a form of therapy that is highly efficacious, almost completely devoid of serious toxicity, and readily administered to ambulatory patients. It also has provided health administrations with a means to launch practical mass campaigns against these diseases.

Clinical results and by-effects in treatment of early syphilis with combined arsenical-bismuth treatment. Povl Mller. Indian J. Ven. Dis., 17 : 29–34, Jan.–Mar. 1951.

The advantages and disadvantages of penicillin therapy are discussed. From personal observation of approximately 625 syphilitic patients given a combined arsenical-bismuth treatment, author concludes that this type of treatment for syphilis in a Scandinavian country yields satisfactory results.

### INDUST. MED., CHICAGO

Antibiotics. George F. O'Brien. Indust. Med., 20 : 124–128, Mar. 1951.

Dosage schedules, effectiveness, toxicity, and use of penicillin, streptomycin, aureomycin, and chloramphenicol in treatment of various diseases, including gonococcic infections, are reviewed.

### J. A. M. A., CHICAGO

Penicillin levels in the blood. Significance of type of preparation, dosage, kidney function and weight. A. Benson Cannon, Meyer H. Slatkin, Benjamin Chester, and Rosalind Moses. J. A. M. A., 145 : 1031–1034, Apr. 7, 1951.

This study represents the first stage of an over-all evaluation of penicillin in the treatment of syphilis. From observations of 628 patients, the majority of whom were treated for syphilis, the authors suggest that the dosage of repository penicillin be adjusted so that the patient receives at least 3,000 to 6,000 units per pound of body weight. Authors also found that the efficacy of various delayed-action penicillin preparations in prolonging the penicillin blood levels was in the following order: (1) penicillin procaine with aluminum monostearate, (2) penicillin procaine with 2 percent aluminum monostearate and penicillin procaine in oil, (3) penicillin procaine in aqueous solution, and (4) penicillin in oil and wax.

Penicillin in the prophylaxis of ophthalmia neonatorum. H. H. Davidson, Justina H. Hill, and N. J. Eastman. J. A. M. A., 145 : 1052–1055, Apr. 7, 1951.

In 9,241 consecutive newborn treated with penicillin intramuscularly as a prophylaxis against gonorrheal ophthalmia, no cases of this disease developed. In an additional series of 4,163 consecutive newborn, one or more signs of local irritation developed in 10.6 percent of those treated with penicillin ointment, 13.8 percent of those given intramuscular injections of penicillin, and 48.7 percent of those given silver nitrate. On the basis of these observations and the literature, the authors are convinced that penicillin ointment is the most efficacious, the safest, and least irritating agent for the prophylaxis of ophthalmia neonatorum in hospital practice and recommend it for this purpose in preference to silver nitrate.

Penicillin treatment of syphilis. Arthur C. Curtis, Delmas K. Kitchen, Paul A. O'Leary, Herbert Rattner, Charles R. Rein, Arthur G. Schoch, Loren W. Shaffer, and Udo J. Wile. J. A. M. A., 145 : 1223–1226, Apr. 21, 1951.

Specific treatment schedules recommended for the various types of syphilis are presented. Authors feel that, on the basis of approximately 8 years' experience, penicillin therapy far surpasses any previously used antisyphilitic remedy when appraised from the therapeutic, economic, technical, toxicity rate, or prophylactic aspects.

"Multiphasic" screening tests. Wilson G. Smillie. J. A. M. A., 145: 1254–1256, Apr. 21, 1951.

The development, advantages, and disadvantages of multiple screening for tuberculosis, syphilis, and other diseases, are reviewed. A multiphasic diagnostic screening unit that is established as a primary public health diagnostic function is considered unsound in its concepts, untenable in its principles, and indefensible in its logic.

Positive Frei reaction in asymptomatic lymphogranulomatosis. Brazil. Foreign Letters. J. A. M. A., 145: 1368, Apr. 28, 1951.

The Frei test with Lygranum antigen was done on 110 prostitutes of the city of São Paulo. Results showed 36 positive reactions (32.7 percent). Tests were made in cases in which anamnestic data did not reveal any lymphogranulomatic infection. Results disclosed the existence of asymptomatic or nonrelated forms of venereal lymphogranulomatosis which may play a relevant part in the dissemination of the disease.

Bejel or desert child syphilis. Turkey. Foreign Letters. J. A. M. A., 146: 54–55, May 5, 1951.

Doctors have reported that bejel is common among the Shammar and Sebii nomads who live in the desert area extending from Eldjezire to Mossul and into the lower Euphrates Valley. Bejel has decreased in the Syrian desert, while the real focus is in the Iraquian desert land. The Sebii Bedouins believe that no one can escape the disease and that it is best to have an attack during childhood.

Congenital syphilis. Editorials and Comments. J. A. M. A., 146: 259–260, May 19, 1951.

A review of the twenty-seventh Annual General Assembly of the International Union Against Venereal Disease and the literature regarding mode of transmission of syphilis from parents to offspring is presented. The fact that spirochetes are rarely found in the organs of a fetus of less than 5 months suggests that the virus is not capable of passing the placental barrier until a late stage, namely, at the moment when this barrier has undergone certain anatomic and biologic changes.

Semen studies and fertility. Edward T. Tyler. J. A. M. A., 146: 307–314, May 26, 1951.

Etiologic factors and therapeutic results in 408 infertile marriages are discussed chiefly from the standpoint of the husband. Gonorrhea was found to be the second commonest cause of azoospermia but only an occasional cause at other levels of infertility.

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J. Bact., Baltimore

The separation and characterization of the growth factor in serum and ascitic fluid which is required by certain pleuropneumonia-like organisms. Paul F. Smith and Harry E. Morton. J. Bact., 61: 395–405, Apr. 1951.

A characteristic of the parasitic pleuropneumonia-like organisms (PPLO) is the requirement of serum or ascitic fluid for growth in vitro. A method of concentrating the growth factor from serum is described. A possible explanation of the mechanism of resistance to penicillin by these organisms is given. Data are given supporting the classification of the PPLO between the bacteria and the rickettsiae in the spectrum of micro-organisms. The proteinaceous substance required by the PPLO adds to the expanding list of microbial growth factors.

Electron microscopic observations of flagellation in some species of the genus *Treponema* Schaudinn. John H. L. Watson, Juan J. Angulo, Francisco León-Blanco, Gerardo Varela, and C. Courtney Wedderburn. J. Bact., 61: 455–461, Apr. 1951.

Electron micrography of flagellation in 9 specimens of *Treponema carateum* Brumpt, 89 specimens of *Treponema* sp. from the so-called Cuban form of pinta,

### J. Bact. Baltimore—Cont.

and 30 specimens of *Treponema pertenue* Castellani is reported. Some data on the number and dimensions of flagella were obtained. Tentative consideration of the laterally placed lophotrichate flagella as a taxonomic characteristic is proposed.

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### J. Insur. Med., Louisville

Cutaneous manifestations of systemic diseases. Importance of evaluation on insurability. Thomas L. Shields. J. Insur. Med., 5 : 18–21, Sept.–Oct.–Nov. 1950.

This discussion is presented with the hope that some of the dermatoses seen by the medical insurance examiner may be more critically evaluated and that those having no effect on longevity will be recognized, so that these individuals may obtain insurance at normal rates. Among the systemic diseases with cutaneous manifestations which the author discusses is syphilis. In evaluation of insurability of a syphilitic patient, the author believes that each case should be considered separately.

Cardiovascular syphilis. M. C. Thorner and George C. Griffith. J. Insur. Med., 6 : 5–7, Dec.–Jan.–Feb. 1950–1951.

Results of a study of the incidence of cardiovascular syphilis at the Los Angeles County Hospital from 1946 to 1950 are presented. Of 2,922 patients studied, 158 (5.1 percent) showed syphilis. Diagnostic criteria, with emphasis on the use of X-rays and fluoroscopy, and the present status of penicillin in the treatment are discussed.

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### J. Invest. Dermat., Baltimore

Procaine penicillin in early yaws. F. Nery Guimarães. J. Invest. Dermat., 16 : 77–79, Feb. 1951.

In this study, 30 patients, whose ages ranged from 3 to 53 years and who showed typical lesions of primary or secondary yaws, were given three injections at 48-hour intervals for a total dose of approximately 900,000 units of a repository procaine penicillin preparation for each 25 kg. of body weight. Complete healing of lesions was observed in all cases in 10 to 15 days. From the results, author concluded that the percentage of clinical cures (93.5 percent) and of patients becoming seronegative within 1 year of treatment (60 percent) was similar to what was recorded by other investigators with penicillin in oil and beeswax.

Universal serologic reaction in rabbit syphilis. Arthur C. Curtis, Richard J. Rowe, Betty J. Baribeau, and Reuben L. Kahn. J. Invest. Dermat., 16 : 131–154, Mar. 1951.

In a series of studies at the Serology Laboratory of the University Hospital, Ann Arbor, universal serologic reactions were obtained in rabbits before and during infection with syphilis and after the administration of penicillin therapy. The data obtained in the experiments indicated that the specific serodiagnostic reaction in syphilis is the result of an intensified universal reaction which develops specific characteristics in the presence of syphilis. Nonspecific serodiagnostic reactions given by some of the rabbits before inoculations, the authors feel, were apparently the result of natural universal reactions of relatively high intensity, so high as to reach the serodiagnostic zone.

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### J. Iowa M. Soc., Des Moines

Venereal disease, a public health education problem in Iowa. J. Iowa M. Soc., 41 : 161, Apr. 1951.

With 1,952 cases of syphilis reported in Iowa during 1950, the rate was a low of 7.48 per 10,000 persons. A table showing incidence and rates in 10 counties is presented. Contact tracing and follow-up programs are briefly discussed.

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### J. Laryng. & Otol., London

Aural vertigo : An account of certain cases resembling Ménière's disease. William McKenzie. J. Laryng. & Otol., 65 : 70–88, Feb. 1951.

A number of cases which resembled Ménière's disease and were observed by the author at Maida Vale Hospital are described. Author states that syphilitic deafness is a rare disease now and there was no suitable case record from Maida Vale to present. A case seen elsewhere,

J. LARYNG. & OTOL., LONDON—CONT.

in which a diagnosis of Ménière's disease was first made, is given. Later, a Wassermann test was found positive.

J. SOCIAL HYG., NEW YORK

Today's crisis and tomorrow's families. As the civilian sees it. Mrs. Oswald B. Lord. J. Social Hyg., 37 : 99–108, Mar. 1951.

Health, education, and social problems of children, families, and communities, brought on by mobilization, are discussed. Control of venereal disease is said to be a serious problem which will increase with the movement of the population and the separation of young people from their homes and home influences.

Today's crisis and tomorrow's families. As the military sees it. M. H. Silverthorn. J. Social Hyg., 37 : 108–113, Mar. 1951.

Military training and character building through education of the men in the armed forces are discussed as objectives of the Department of Defense. Importance of a sense of moral responsibility and self-discipline among naval and military personnel, as part of a venereal disease control program, is stressed.

National and international problems in the control of venereal disease. Norman R. Ingraham, Jr. J. Social Hyg., 37 : 123–129, Mar. 1951.

This is a general discussion on the contribution of the World Health Organization to control of venereal diseases in the Far East, the effects of war and disruption of home and family life on venereal disease incidence in European countries, and the recent decrease in Federal appropriations for control programs in the United States.

What to do. Herman Goodman. J. Social Hyg., 37 : 142, Mar. 1951.

A 10-point plan for control of venereal diseases is presented.

Social hygiene in the Armed Forces. John M. Devine. J. Social Hyg., 37 : 146–152, Apr. 1951.

Venereal disease control program of the Armed Forces is outlined. Repression of prostitution near military areas, cooperation between the services and civilian agencies, and character guidance programs are discussed.

Does the VD pamphlet educate? Beatrice G. Konheim and Dorothy Neuhof Naiman. J. Social Hyg., 37 : 175–181, Apr. 1951.

In this study, a pamphlet, "Questions and Answers About Syphilis and Gonorrhea," was distributed to 165 parents of college students. Two months after its receipt, these parents achieved a significantly higher score on questions based upon information contained in the pamphlet, while a control group of 77 parents pretested and posttested with the experimental group showed no increased knowledge.

World health and treponematoses. Thorstein Guthe. J. Social Hyg., 37 : 182–186, Apr. 1951.

In this opening address at the International Symposium on Syphilis in Paris, September 25–October 3, 1950, author discussed the role of the World Health Organization in control of treponematoses, its fellowships and training courses, advisory services, and expert committees and research.

J. SOUTH CAROLINA M. A., FLORENCE

The clinical significance of foreign body granulomas: a review. Douglas Symmers. J. South Carolina M. A., 47 : 14–20, Jan. 1951; 66–71, Feb. 1951.

Histologic appearance, symptomatology, and treatment measures of various granulomas, including those due to syphilis and lymphogranuloma venereum, are considered in this review.

J. THORACIC SURG., ST. LOUIS

Successful repair of an aortic aneurysm with sternal perforation. R. Adams Cowley, Herbert E. Sloan, and Neil H. Sullenberger. J. Thoracic Surg., 21 : 159–163, Feb. 1951.

A case report is presented of a 38-year-old white woman admitted to the University Hospital, Ann Arbor, Mich., with a complaint of a "throbbing lump" over the upper sternum accompanied by a dull aching pain in the back and shoulders. The Kahn complement-fixation test was positive for syphilis, and the patient was diagnosed as having aortic aneurysm with sternal perforation. Polythene containing dicetyl phosphate, because of its

### J. THORACIC SURG., ST. LOUIS—CONT.

fibrous tissue excitant characteristics, was utilized successfully in treatment. Wrapping with strips of polythene offers a suitable method of treating aneurysms which, because of their position, friable walls, and close proximity to great vessels and vital structures, make other methods hazardous.

### J. TROP. MED., LONDON

Some comparisons of skin diseases in different climates and races. G. H. V. Clarke. J. Trop. Med., 54: 49–53, Mar. 1951.

Incidence of various skin diseases, including those due to syphilis and yaws, among Negroes, Europeans, and Indians is presented. A comparison of the differences between the Negro and the European under both tropical and temperate conditions is made.

### LANCET, LONDON

The danger of penicillin therapy in gonorrhoea. A. A. M. Reekis. Lancet, 1: 327–328, Feb. 10, 1951.

From a review of the literature and personal observation of three patients, author concludes that an unexplained fever and malaise occurring shortly after penicillin therapy for gonococcic urethritis strongly suggest coexisting syphilis, and the symptoms and signs of the oncoming syphilis may be suppressed, masked, or delayed.

### M. CLIN. NORTH AMERICA, PHILADELPHIA

Practical aspects of penicillin administration. Specific indications, dosage forms, reactions, comparative costs. Paul S. Rhoads. M. Clin. North America, 35: 23–36, Jan. 1951.

A review is presented of the clinical situations in which penicillin is the antimicrobic agent of choice and those in which some other antibiotic, antiserum, or sulfonamide should be used in combination with it. Gonorrhea and syphilis are included among the conditions in which penicillin is superior to other forms of treatment.

Modern trends in syphilis therapy. Sheldon A. Walker and Richard B. Stoughton. M. Clin. North America, 35: 143–151, Jan. 1951.

The objections of the more conservative syphilologists to the use of penicillin alone in treating all forms of syphilis are reviewed, and the importance of planning therapy according to the patient's needs is considered. Routine schedules of treatment which conform mainly to the ideas of the majority of modern syphilologists are presented for the various types of syphilis. Results of treatment and reactions to penicillin are reviewed.

### REV. SAN. Y ASIST. SOCIAL, CARACAS

Prenatal and congenital syphilis in Venezuela. A statistical analysis. (Summary.) Rev. san. y asist. social, 15: 275–353, Sept.–Oct. 1950.

The problem of prenatal and congenital syphilis in Venezuela is discussed from the standpoint of statistics, transmission, treatment, and control legislation. In a study of 160 syphilitic pregnant women, the authors found that treatment with penicillin was effective in all but three cases. Treatment of 83 children with congenital syphilis was effective in 89 percent of the cases.

### TR. ROY. SOC. TROP. MED. & HYG., LONDON

A medical survey in a Gold Coast village. M. J. Colbourne, G. M. Edington, M. H. Hughes, and A. Ward-Brew. Tr. Roy. Soc. Trop. Med. & Hyg., 44: 271–290, Dec. 1950.

Results of a medical survey of health and sanitary conditions in a village of 255 inhabitants show that 75 percent of the villagers gave evidence of active or quiescent yaws infection. Three cases of gonorrhea and no cases of syphilis or lymphogranuloma venereum were found. Clinical manifestations and treatment of yaws are reviewed.

The treatment of yaws by aureomycin. O. Ampofo and G. M. Findlay. Tr. Roy. Soc. Trop. Med. & Hyg., 44: 311–313, Dec. 1950.

Treatment of yaws in seven West African patients is described. In five patients with florid secondary yaws, oral administration of 250 mg. of aureomycin hydrochloride three times daily for 7 days was sufficient to clear up the secondary lesions and to prevent recurrence for at least 6 months. In two patients with late secondary and tertiary lesions, oral administration of 500 mg. three times daily for the same period showed results as effective but less spectacular than those in the case of secondary yaws.

Chloramphenicol in the treatment of yaws and tropical ulcer. O. Ampofo and G. M. Findlay. Tr. Roy. Soc. Trop. Med. & Hyg., 44: 315–318, Dec. 1950.

In this study, five patients with yaws and six patients with tropical ulcers were treated with varying doses of chloramphenicol given orally. From the results authors conclude that chloramphenicol shares with penicillin and aureomycin the power to heal very rapidly primary and secondary lesions of yaws and also to extirpate the bacterial flora from tropical ulcers.

The incidence of certain skin diseases in Western Samoa: A preliminary survey. M. J. Marples. Tr. Roy. Soc. Trop. Med. & Hyg., 44: 319–332, Dec. 1950.

Results of a survey of skin conditions among children in Western Samoa, conducted by the Medical Research Council of New Zealand during the summer of 1948–49, are presented. Among 1,346 children examined, 32.9 percent had yaws.

Some impressions of the Muruts of North Borneo. M. C. Clarke. Tr. Roy. Soc. Trop. Med. & Hyg., 44: 453–464, Feb. 1951.

Health conditions among the Muruts, an aboriginal people living in the interior of North Borneo, are described. While gonorrhea is considered to be widespread among all races in North Borneo, syphilis and lymphogranuloma venereum are absent, rare, or insignificant in their effects among the Muruts.

# STATISTICS

## Clinic and Epidemiologic Data Reported to the Public Health Service by State and Territorial Health Departments, Fiscal Years 1947–50

| | 1947 | 1948 | 1949 | 1950 |
|---|---|---|---|---|
| Diagnostic examinations in public clinics | 1, 764, 045 | 2, 328, 002 | 2, 276, 957 | 2, 717, 707 |
| Percent of examinations in which 1 or more cases of venereal disease were found | 29. 8 | 21. 0 | 20. 3 | 15. 7 |
| Number of previously untreated syphilis cases found per 100 patients examined | 9. 3 | 6. 7 | 5. 7 | 3. 9 |
| Number of previously untreated primary-secondary syphilis cases found per 100 patients examined | 3. 2 | 1. 9 | 1. 3 | . 7 |
| Percent of early syphilis cases discovered sent to a rapid treatment center for treatment | 61. 0 | 65. 5 | 57. 4 | 50. 1 |
| Number of contact investigations completed | 476, 368 | 408, 054 | 380, 079 | 339, 966 |
| Number of other suspect investigations completed | 177, 169 | 164, 003 | 153, 435 | 148, 563 |
| Approximate number of contacts obtained per primary and secondary syphilis patient | 1. 79 | 2. 30 | 2. 53 | 2. 65 |
| Approximate number of syphilis infections identified by contact investigation per primary and secondary syphilis patient | . 54 | . 70 | . 72 | . 69 |
| Approximate number of syphilis infections brought to treatment through contact investigation per primary and secondary syphilis patient | . 30 | . 37 | . 40 | . 39 |
| Approximate number of primary and secondary syphilis cases brought to treatment through contact investigation per primary and secondary syphilis patient | . 15 | . 17 | . 18 | . 19 |

Source: Quarterly Venereal Disease Control Activity Report (PHS Form 724) and Special Semiannual Tabulations of Contact Investigation Data, June 14, 1951 (MC–WFU–EJD) mw.

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# *The* JOURNAL *of* VENEREAL DISEASE INFORMATION

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FEDERAL SECURITY AGENCY

Public Health Service

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# Some Observations on Neurosyphilis in the African Negro

**R. R. Willcox, M. D.**[1]

The incidence of neurosyphilis in the African is one of many aspects of African medicine which are subjects of disagreement. It has usually been considered, however, to be relatively small when the high incidence of early syphilis and the standards of its treatment have been taken into consideration. The following are some explanations which have been offered to account for this: (*a*) Racial susceptibility to the treponeme, it being postulated that *Treponema pallidum* is not as neurotropic in the African as in the European, and that, therefore, the manifestations of late syphilis in the African are usually gummatous; (*b*) that the African does not live long enough to acquire the complications of late syphilis (although there are no reliable statistics to prove this point); (*c*) that the endemic malaria is curative or prophylactic for late syphilis when it does develop; (*d*) that much of the so-called syphilis is, in fact, yaws, which disease is said not to produce late sequelae in the nervous system; and (*e*) that in the tropics, serologic tests for syphilis often give false-positive reactions, not only because of technical difficulties, but also because of the presence of diseases other than yaws and syphilis, such as leprosy, malaria, relapsing fever, and trypanosomiasis.

## Recorded Experience Concerning Neurosyphilis in the African

In 1908, Lambkin (*1, 2*) made one of the first evaluations of venereal disease in Africa, and reported that parasyphilitic infections were rare in Uganda (believing that syphilis had not been in widespread existence long enough for parasyphilitic infections to occur often), but claimed to have seen a number of patients with early tabetic symptoms. His observations were, of necessity, not confirmed by pathologic investigations. Lambkin's visit led to the establishment of treatment centers from which the Government Medical Service was later to develop. Keane (*3*), one of the early workers in these clinics, also stated that the nervous system was but rarely affected by syphilis, and noted that this appeared to substantiate a view, which was then held by many syphilologists, that if cases of secondary syphilis responded favorably to treatment, the lesions of late syphilis were unlikely to appear.

More recently, the situation was reconsidered by Davies (*4*), who postulated that the earlier observations of Lambkin and Keane had been based on a fallacy, and that they had mistaken yaws for syphilis. If one is a unionist on the question of yaws and syphilis (*5, 6*), it may be argued that such a point is of small significance. For dualists, on the other hand, the matter is of some importance, for yaws is said not to affect the nervous system. Some of those who do not readily accept the unionist view, e. g., Hackett (*7*), have based their observations on Uganda where, it is stated, the predominance of yaws or of syphilis has become defined in two separate areas,

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and it is claimed that in early cases, at any rate, it distinction on clinical grounds can be made without difficulty. It is not, however, considered profitable to be sidetracked into the yaws-syphilis controversy, but rather to ascertain whether African yaws commonly produces complications in the nervous system.

In 1947, Davies (*4*) reported that syphilitic lesions were found in 338 (11.3 percent) of 2,994 post-mortem examinations performed in the years 1931–48 at Mulago Hospital, Uganda. Syphilis had been the cause of death in 261 cases. Gummata were found in 26 cases; aortitis, in 207; neurosyphilis, in 154; and combined aortitis and neurosyphilis, in 53. Eighty-four patients on whom post-mortem examinations were performed at Mulago Hospital had come from a mental hospital. Of those found to have neurosyphilis, 72 had general paralysis of the insane; 3 had pachymeningitis haemorrhagia; 28 had meningovascular syphilis; 3 had transverse myelitis; and in 48 cases, insufficient details were available to make a complete diagnosis. In 9 of the 25 cases in which autopsies were performed, the tests for syphilis were positive in both the blood and cerebrospinal fluid; positive in the blood only in 14; and, in 2 cases, negative in both blood and cerebrospinal fluid.

Davies (*4*) quoted Billington in stating that 0.4 percent of all patients admitted to Mulago Hospital had neurosyphilis, and that the cerebrospinal fluid of Africans with neurosyphilis always shows some change from normal, the most frequent change being a raised protein content. The cell count is usually, but not always, raised, and repeated examinations may be necessary.

Muwazi and Trowell (*8*) stated that they believed that neurosyphilis was the cause of no less than 30 percent of the cases of insanity in patients at Mulago Hospital, that the idea that neurosyphilis is rare in the African is erroneous, and that the difficulties of examining the central nervous system in the African and in the collection of cerebrospinal fluid specimens, the acknowledged rarity of clinical tabes dorsalis, and the lack of mental hospitals and facilities for accurate diagnosis, were all factors responsible for this view. In support, they quote a Dr. Hutton who was of the opinion that neurosyphilis caused from 17 to 20 percent of the insanity in Uganda.

Webb and Holliday (*9*), also in Uganda, analyzed the case records of nearly 8,000 patients with late syphilis and found evidence of syphilis of the nervous system in 149. This might seem to indicate that the incidence of neurosyphilis was slight; but there were, in addition, 566 patients with headaches, hemiplegias, etc., who were considered to have syphilis with neurologic signs which may have been of circulatory origin. Thus, in over 700 of the 7,711 cases of late syphilis it might be considered that the nervous system was involved. As this incidence takes no account of asymptomatic neurosyphilis, diagnosed only by an examination of the spinal fluid, it may be a fact that the total incidence of neurosyphilis in the African Negro may approximate that of the American Negro. Certainly there is good reason to suppose that the African Negro should show the same racial susceptibility to neurosyphilis as the American Negro, although it should not be forgotton that the former still often lives in a malarious environment.

In 1939, Loewenthal (*10*) reviewed syphilis in Africa and found neurosyphilis only rarely in post-mortem examinations. A belief that neurosyphilis was rare in Africa was also held by Becker (*11*), who analyzed 3,000 autopsy reports on natives and colored persons at the Johannesburg General Hospital during the years 1924–38. There were 231 cases from syphilis, 176 with involvement of the cardiovascular system, but only 14 with involvement of the nervous system. Other observations include those of Gordon (*12*), who considered that neurosyphilis was not rare among the natives of Kenya. In an earlier report of an American expedition to Liberia and the Belgian Congo, Strong and Shattuck (*13*) stated that while no typical cases of tabes or paresis were encountered, a number of persons were observed in institutions who were suffering from dementia and receiving treatment with antisyphilitic drugs. No trypanosomes were recovered from the blood or spinal fluid of these patients.

The prevalence of meningovascular syphilis in West Africa, and its possible confusion with trypanosomiasis, was also noted by Willcox (*14*). Gelfand (*15*), writing from Southern Rhodesia, where trypanosomiasis is not a country-wide problem, states that meningovascular syphilis is the most common form of neurosyphilis in Africans but that tabes and paresis are relatively infrequent.

Cook (*16*), in the course of a mass blood-testing survey, encountered the same belief as to the rarity of neurosyphilis in the Negro in Trinidad. He examined the cerebrospinal fluid of 1,028 patients who were known to have had repeated positive reactions to serologic tests for syphilis. Eighty percent had normal fluid; 5.1 percent showed cell counts of 6 to 150 per cubic millimeter, but no other abnormality; and 14.9 percent (153 patients) showed positive fluids, but in only 27 cases were the changes marked. Of 527 patients clinically examined, 82 were found to have neurosyphilis; 48 of these were asymptomatic, and 34 were symptomatic. Of the patients with symptomatic neurosyphilis, 13 were diagnosed as having tabes dorsalis; 1, taboparesis; 5, paresis; 7, meningovascular and vascular syphilis. Eight had optic atrophy believed to have been caused by neurosyphilis but with no other signs of neurosyphilis. (Seventeen cases of optic atrophy from all causes were found in this study.) When patients with present and past lesions of yaws were eliminated, the number of patients diagnosed as having neurosyphilis was reduced to 417, and it was calculated that the total neurosyphilis rate was 19.7 percent. It was concluded that neurosyphilis in the Negro was not rare in the tropics.

There are, therefore, divergent views as to the incidence of neurosyphilis in the Negro in his native land. The data are incomplete because of the many difficulties in the diagnosis of neurosyphilis under conditions prevailing in Africa. Abnormalities of the central nervous system often are difficult to evaluate, especially those of the pupillary reflexes outside of a dark room, which is seldom available. The tendon reflexes are often difficult to obtain with certainty. During a venereal disease survey of the African recently undertaken by the author in Southern Rhodesia (*17*), it was felt that inequality of the pupils was about the only potential ocular sign which could be regarded as reliable, and even so, there were a number of conditions other than syphilis which might be responsible. Difficulties in examination of the spinal fluid lay in the availability of the laboratory and the frequent impossibility of being able to obtain a cell count within a reasonable time following the collection of the specimen, in addition to the increased likelihood of deterioration of the fluid through contamination in the subtropical heat. Add to these the language difficulties in trying to obtain a proper history, especially of mental upset, the virtual impossibility of extracting facts from peoples who do not know their age and barely count the years, and the frequency of false-positive reactions to serum tests for syphilis in a malarious country, and the full extent of the problem will be appreciated.

## Personal Experience in Southern Rhodesia

Unlike previous venereal disease surveys in Africa, the author's survey in Southern Rhodesia was undertaken with the use of a mobile laboratory. Although the primary object of the survey was to gather data upon which to base recommendations concerning the treatment of early syphilis, efforts were made to unearth cases of late syphilis, proving the diagnosis, when possible, by pathologic examination. About 1,500 patients were examined in the various mine, mission, and military hospitals, and several thousand others were examined in schools, kraals, and selected locations. Data were collected, when possible, from medical officers on the spot. In addition to the mass serologic testing, serologic tests of several selected groups were performed. Eight hundred and twenty-nine lepers were serologically tested; of these, 365 were clinically examined, as well. Sixty-seven inmates of a school for the blind were serologically examined, also. Cerebrospinal fluids and specimens of blood were taken from 42 epileptics, and from 13 other persons who were regarded as possible sufferers from late syphilis, who were found among the patients in a number of rural clinics. In addition, figures were obtained of the results of 658 serologic tests for syphilis which had been previously performed on patients admitted to a large urban mental hospital which accepts patients from the entire country. Here, cerebrospinal fluids were taken from 117 persons who were, on the basis of these tests or clinical examination, considered as possible sufferers from neurosyphilis.

The results are considered under three headings: (1) epilepsy; (2) insanity; and (3) others.

### *Epilepsy*

McElligott (*18*), on visiting British West Africa, was impressed by the number of epileptics who were being treated for burns caused by falling into open fires, and he considered it unlikely that all such cases were idiopathic. In the rural districts of Southern Rhodesia, one could not fail to notice the considerable numbers of these badly scarred and mutilated persons, past caring for themselves even if they had been acceptable in their homes, who were making permanent or semipermanent residence in the clinics. These persons were most evident in one group of nine rural dispensaries which were spread over an area of approximately 8,000 square miles and were administered from a central hospital. The patients were under the care of one doctor, and much of the diagnosis and treatment was left, perforce, to the native orderlies.

The patients in these clinics were all serologically tested for syphilis, and cerebrospinal fluids which were taken from 42 epileptics and from 13 other patients who were regarded as possible sufferers from late syphilis were taken to the base hospital where the mobile laboratory was established. Some degree of deterioration of the spinal fluid specimens was noted in 15 cases, as sometimes 24 hours elapsed after the fluid had been drawn before it could be examined. As it was not possible to examine the fluids except as to cell count, Nonne-Apelt protein reaction, and to examine for syphilis by the Ide and Kahn tests, the results must be viewed with some reserve.

Of the 42 epileptics, 21 were male and 21 were female. The group included age levels from childhood through old age. It was estimated that 65 percent of them were over 40 years of age; two-thirds of these were childless, and on that account it is not difficult to estimate how they were regarded by their fellows in the kraals. Nineteen showed scars or actual burns which had resulted from falls into open fires, for which three had had amputations of legs; one, of a forearm; and another, of a hand. Another had lost four fingers, and two others showed contractures at the ankle joints.

Of 32 patients concerning whom information was recorded, 13 (40.6 percent) had had the njovera, and 19 had not. "Njovera" is the word used by the Karanga peoples for venereal syphilis and also for an extravenereal infection of childhood. In the past, it has been considered by some as being yaws, but is believed by the writer, who has seen both diseases, to be indistinguishable from the bejel of the Euphrates Arab (*19*). The histories of njovera in these patients were typical, the lesions consisting of sores in the mouth, privates, thighs, buttocks, and axillae. One had had sores in the head, and another had had sore throat.

Kahn tests of the blood serum gave 34 negative reactions, 1 doubtful, 4 positive, and 3 unsatisfactory. The seronegativity rate, therefore, was 87.2 percent. Comparing this with a 79.0

seronegativity rate in 1,527 other patients in the same clinics, or 81.8 percent in the same patients when known cases of venereal disease had been excluded, shows that there was no higher rate of seropositivity in the epileptics than in the group from which they were drawn.

Clinical examination of one elderly woman whose blood test was negative revealed that she had lost the posterior portion of the soft palate, as well as part of her nose. Another elderly female patient from whom negative serologic results were obtained had a flat bridge of the nose, and the greater part of her soft palate was missing. An old man whose blood test was positive had a stinking ulcer over his left hip.

Because of delay in the examination of the fluid, cell counts were performed on only 21 samples; in 14 of these, 5 cells or less per cubic millimeter were shown; in the 7 remaining, the readings were so dubious that it was impossible to interpret them with accuracy. The Nonne-Apelt test, and the Ide or the Kahn spinal fluid test gave negative results in all of the 42 epileptic patients.

Figures were obtained, also, on the results of serologic tests for syphilis (Wassermann, Kahn, Kolmer, or Rytz) performed during the previous year on the inmates of a large African mental institution in Bulawayo. Testing of 496 male patients resulted in 78 positive or weakly positive reactions; the seronegativity rate was 84.3 percent. Of 64 male epileptics only 7 had positive or weakly positive tests; the seronegativity rate in this group, therefore, was 89.1 percent. Of 14 female epileptics, 1 had a positive test, and 2 had doubtful positive tests; the seronegativity rate in this group was 78.6 percent, whereas the seronegativity rate for all the female inmates (162) was 76.5 percent. These percentages illustrate again that positive results from serologic tests for syphilis are not more frequently obtained in a group of epileptics than in the general group from which they are taken.

Our survey team made further serologic, clinical, and cerebrospinal fluid examinations of 117 asylum inmates from whom positive or doubtful reaction to serologic tests previously had been obtained. Of these, 13 (7 male and 6 female) were subject to fits; 12 had been diagnosed as being epileptic; and 1, who had a transient hemiplegia, had been diagnosed as having an "organic disease of the brain." Repetition of the serologic tests for syphilis resulted in 5 positive, 5 negative, and 3 doubtful reactions. Cell counts, protein estimations by proteinometer, and Wassermann tests performed under standard laboratory conditions were entirely normal and negative on 12 of the spinal fluid samples, while on the thirteenth, which was taken from a patient with a previous doubtful reaction to the serologic test, the reaction to the Wassermann test given by our survey team was also doubtful. The cell count, however, showed only two white cells per millimeter, and the protein content was 15 mg. percent.

Thus, the evidence presented lends no support to a view that meningovascular syphilis is responsible for most of the epilepsy in Africa.

### *Mental Disease*

As previously stated, the seronegativity rate of 496 male patients of a large African mental institution in 1948 was 84.3 percent, while for 162 female patients the rate was 76.5 percent. This compares with 79.0 percent for 1,527 hospital patients who were tested in one rural area during the survey, or 81.8 percent if patients who are known to be venereally infected are excluded. Of 561 adults who lived in towns and who were not hospital patients, the seronegativity rate was 72.6 percent (the possibility of false-positive results has already been stressed). Of 1,368 hospital patients in rural and semirural areas there was a seronegativity rate of 64.5 percent, or 67.9 percent if known venereal disease patients are excluded. As the mental institution, being the only one of its kind, accepted patients from all over the country, the figures for its patients do not appear to show an undue preponderance of positive reactions to serologic tests for syphilis in comparison with the populations from which they were taken. It is evident, however, apart from the confusion which may arise from false-positive results, that something more than a serologic examination is required before a diagnosis of neurosyphilis in mental patients can be said to be established.

The results of serologic tests of the asylum inmates were tabulated under the institution's classification of each patient's type of mental disorder. Apart from those who were already diagnosed as having general paresis, however, nothing statistically striking was noted, although there were a number who had been diagnosed as having "organic disease of the brain," "secondary dementia," "cerebral arteriosclerosis," etc., who were suspect.

One hundred and seventeen patients from whom previous doubtful or positive reactions to serologic tests for syphilis had been obtained, or who had some signs of neurosyphilis, were serologically rechecked and examinations of the cerebrospinal fluid were made. The detailed results of these investigations are being reported more fully (*20*). Seventy-seven of the patients were males, and 40 were females. In 77 patients, the previous serologic tests for syphilis had been positive, in 36 doubtful, and in 4 others who were suspected of having had syphilis, serologic results were negative. Lumbar punctures had been performed previously on 29 patients; abnormal findings had been noted in 8 of these.

In the course of serologic retesting, 66 positive, 16 doubtful, and 35 negative reactions to the Kahn test were obtained. Fourteen patients (11 males and 3 females) showed some abnormality in the spinal fluid. Nine positive reactions and one doubtful reaction to the Wassermann test were noted. The cases of 103 patients with negative spinal fluids were reviewed in the light of clinical and mental signs, past cerebrospinal fluid examinations, and previous antisyphilitic treatment, so that cases which were "burnt out" or had undergone pathologic "cure" should not be omitted. A maximum number of 22 cases of neurosyphilis were found; this number was reduced to 18 after more critical examination of the patients.

Thus, between 32 and 36 cases (in 25 to 29 male and 7 female patients) of possible neurosyphilis were found in a group of 117 mental patients (77 males and 40 females) who had previously been shown to have positive or weakly positive reactions to serologic tests for syphilis. These 117 patients were part of a group of 658 inmates, of whom approximately 500 were male, of an African mental hospital. Although double-checking the serologic tests would tend to exclude many patients from whom false-positive reactions had been obtained previously, the later 66 positive and 16 doubtful reactions ignore the patients who had undergone serologic cure, spontaneous or otherwise. On the other hand, it is possible that there were false-negative reactions in the larger number of patients who, as a result, did not undergo the second serologic test. It must not be forgotten, either, that no proof of neurosyphilis can be obtained in the cases of patients in whom pure syphilitic vascular disease was responsible for the mental symptoms, although the percentage of seropositive findings in the institution as a whole, when compared with that of the surrounding population outside, does not suggest that this was as common as might first be thought.

It is interesting to observe that in 77 males tested there were 29 cases of possible neurosyphilis (37.7 percent), while in 40 females there were only 7 possible cases (17.5 percent).

### *Others*

Of 13 nonepileptic persons who were selected in the rural clinics for cerebrospinal fluid examinations, 2 had generalized pains which were thought to be caused by syphilis; 2 had Parkinsonism (which may have been postencephalitic); 1 had a lower motor neuron lesion of the arms, 1 had a stroke; 1 appeared to have had poliomyelitis; 2 showed optic atrophy; 1 was thought to be suffering from general paralysis of the insane; 1 had headache associated with past syphilis; 1 was mentally deficient; and 1 presented a flat nose caused by past treponematosis. Five of the thirteen admitted having had njovera, 1 in childhood, and 4 in adulthood. Of 1,620 adults questioned in the area under consideration, 292 (18.1 percent) admitted having had it in childhood, and 8.8 percent in adulthood. These percentages represent a total treponematosis rate of 26.9 percent.

Positive serologic reactions to the Kahn test were obtained from the patient with a flat nose (a girl 16 years of age), and from the middle-aged lady with headaches which were thought to be caused by past syphilis. Both of these persons had had njovera in infancy. The two patients with generalized pains, both of whom also had had njovera in childhood, gave doubtful reactions. Reactions of the remaining patients were negative. Cell counts which were performed on five of the spinal fluids resulted in normal readings in four cases, while one spinal fluid, which had deteriorated, was open to question. The Nonne-Apelt test was negative in all 13 cases, as were the Kahn and Ide tests. The persons upon whom these tests were made were selected at random from approximately 1,100 patients in 6 clinics.

Serologic examinations were made also of 829 lepers in a leper settlement. It was felt that the leper colony represented a relatively more elderly community group and was likely to contain many cases of undiagnosed late syphilis. Three hundred and sixty-five of the lepers were clinically examined; 8 of them showed pupillary abnormalities possibly caused by neurosyphilis.

Sixty-seven persons, chiefly adolescents, of a school for the blind were also examined serologically. In 57, blindness was wholly or partially corneal in nature, and in 10, wholly of an optic nerve or retinal type. Only one of the latter exhibited a positive Kahn test, and in one the reaction was doubtful.

In addition to the foregoing, patients were examined in some 50 hospitals and clinics during the course of the survey. No typical case of tabes dorsalis was encountered and only one doctor questioned claimed to have seen one, and one case of taboparesis was found in the mental hospital. On the other hand, a number of cases of meningovascular syphilis, often with hemiplegias, were observed, as were several suspected cases of early syphilitic meningitis.

## Summary and Conclusions

1. The literature concerning neurosyphilis in the African Negro has been reviewed. Recent observers considered that involvement of the nervous system is more common than was thought at first, and have suggested that it may be responsible for 17 to 30 percent of insanity in Uganda.

2. Observations concerning neurosyphilis in the African, made during the course of a venereal disease survey of the African in Southern Rhodesia, have been described.

3. Neurosyphilis in the African usually assumes the meningovascular form; paresis is uncommon; and tabes dorsalis is still more uncommon.

4. A serologic and cerebrospinal fluid examination of 42 epileptic inmates of rural clinics, and a consideration of the findings in 78 epileptic inmates of an African mental hospital, with an examination of cerebrospinal fluid in 13, brought no evidence to suggest that meningovascular syphilis was responsible for the bulk of African epilepsy.

5. The results of serologic testing for syphilis of 658 patients in an African mental hospital did not show an appreciably higher incidence of positive reactions than were obtained by the survey team on other persons.

6. Spinal fluid examinations were made of 117 inmates of an asylum who had previously shown positive or doubtful evidence of syphilis. Abnormalities were found in 14. In addition, there were between 18 and 22 other inmates with normal spinal fluids who were considered as possibly having undergone "cure," spontaneous or otherwise.

7. The percentage of positive reactions in cases of insanity that were possibly due to syphilis represents between 27.3 and 30.8 percent of those tested, but only 4.9 to 5.5 percent of the mental cases from which they were drawn. This is a substantially lower figure than the 17 to 30 percent reported from Uganda.

8. It is noted that 29 cases of possible neurosyphilis were found in 77 males with mental disease (37.7 percent), while in 40 females with mental disease only 7 positive reactions (17.5 percent) were obtained.

9. Eight of three hundred and sixty-five lepers who were clinically examined showed pupillary abnormalities; and of 10 persons in a blind school with optic nerve or retinal blindness, only 1 had a positive reaction and 1 a doubtful positive reaction to serologic testing for syphilis.

10. A number of cases of meningovascular syphilis and early syphilitic meningitis, but no case of tabes dorsalis, were encountered. One case of taboparesis was seen.

11. There is no obvious reason, apart from the presence of endemic malaria, why the African Negro should not have the same susceptibility to neurosyphilis as the American Negro. The more general use of cerebrospinal fluid examination might bridge the apparent gap in incidence which is evident even in the data presented.

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# Serology Problems (Syphilis) in Central America[1]

**Genevieve W. Stout, M. A.;[2] John C. Cutler, M. D.[3]**

Syphilis serology in Central America presents a special problem due to the fact that in this area certain test methods which have proved reliable in the United States give a high percentage of positive reactions due, apparently, to conditions other than syphilis. There is a marked difference in reactivity of the older tests using lipoidal antigens, such as the Kahn, Mazzini, and Eagle, and the newer tests using cardiolipin antigens. The Kolmer complement-fixation test reacts similarly to the tests using cardiolipin antigens, giving a markedly lower level of reactivity than the Kahn and Mazzini tests. Such differences have not been apparent in the United States.

The Washington Serology Conference in 1941 (*1*) was held for the purpose of evaluating the American tests for syphilis. The six most commonly used tests which received satisfactory ratings in respect to sensitivity and specificity were Eagle, Hinton, Kahn, Kline, Kolmer, and Mazzini. All of these tests are satisfactory as an aid in the diagnosis of syphilis in the United States "when (1) standardized reagents and adequate controls are used, (2) technic recommendations are strictly adhered to, and (3) results are reported as specified for each procedure" (*2*).

The isolation, purification, and identification of cardiolipin by Pangborn (*3*) represented an important advance in the serology of syphilis. In combination with purified lecithin and cholesterol, cardiolipin forms an antigen which may be used effectively for the diagnosis of syphilis. Various new tests have been developed and existing technics have been modified for use with this type of antigen. At the present time, in the United States, comparative results show that tests using lipoidal antigens, as well as those using cardiolipin antigens, are satisfactory as an aid in the serodiagnosis of syphilis. The cardiolipin tests have been shown by various workers to be more specific, but a certain number of false-positive reactions must still be expected.

In 1946, the Pan American Sanitary Bureau, with assistance from the United States Public Health Service, established a Venereal Disease Research Laboratory in Guatemala, Guatemala, for the purpose of conducting an investigation of the serologic picture presented by the people in that area. It was soon noted that a high incidence of positive reactions was obtained when tests employing lipoidal antigens, such as Kahn, Mazzini, and Eagle, were used, while the tests using cardiolipin antigens, such as the VDRL slide test and the Kolmer complement-fixation test, gave a much lower percentage of positive reactions.

In order to evaluate the difference in test reactivities, studies were conducted among children where the incidence of acquired syphilis is low. Children from an orphanage in Guatemala City and from a school in the Port of San José, Guatemala, an endemic malaria area, were selected. Papers (*4*, *5*) were presented at the Second Congress of Venereal Diseases in Central America, held in Guatemala in 1948, giving the results obtained as of that date. Table 1 compares the reactivity of the Kahn, Mazzini, Kolmer, and VDRL tests in the orphanage group.

From this study Aragón (*4*) concludes:

1. The existence of congenital syphilis in the Hospicio Nacional is almost nil, since of the 515 children examined, only one case of congenital syphilis was confirmed clinically as well as serologically, and two cases were found in an asymptomatic form.

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[1] Presented before the Laboratory Section of the American Public Health Association, St. Louis, Mo., November 2, 1950.

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**Table 1.**—*Comparison of results of serologic tests among 515 children, aged 1 to 18 years, examined at the Hospicio Nacional de Guatemala*

| Name of test | Total tests performed | Results | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Positive | | Doubtful | | Negative | | Quantity not sufficient | | Anticomplementary | |
| | | Number | Percent | Number | Percent | Number | Percent | Number | Percent | Number | Percent |
| Kahn | 677 | 106 | 15. 6 | 70 | 10. 3 | 492 | 72. 7 | 9 | 1. 3 | ------ | ------ |
| Mazzini | 682 | 78 | 11. 4 | 155 | 22. 8 | 442 | 64. 8 | 7 | 1. 0 | ------ | ------ |
| VDRL | 683 | 15 | 2. 2 | 3 | . 4 | 660 | 96. 6 | 5 | . 7 | ------ | ------ |
| Kolmer simplified | 680 | 18 | 2. 6 | 2 | . 3 | 639 | 94. 0 | 18 | 2, 6 | 3 | 0. 4 |

**Table 2.**—*Comparison of results of serologic tests among 151 children, aged 6 to 14 years, at Port of San José, Guatemala*

| Name of test | Total tests performed | Results | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Positive | | Doubtful | | Negative | | Anticomplementary | |
| | | Number | Percent | Number | Percent | Number | Percent | Number | Percent |
| Kahn | 451 | 98 | 21. 7 | 72 | 16. 0 | 281 | 62. 3 | ------ | ------ |
| Mazzini | 453 | 33 | 7. 3 | 125 | 27. 6 | 295 | 65. 1 | ------ | ------ |
| VDRL | 464 | 5 | 1. 1 | 3 | . 6 | 456 | 98. 3 | ------ | ------ |
| Kolmer simplified | 364 | 8 | 2. 2 | 1 | . 3 | 346 | 95. 1 | 9 | 2. 5 |

2. There is a high incidence of false-positive reactions which obliges us to make a careful interpretation.

3. The VDRL reaction, using cardiolipin antigen, is the most sensitive[4] of all the tests used by us up until this time.

4. The reason for these false-positive reactions is unknown.

The reactivity of the same serologic tests (*5*) with the children of the schools of the Port of San José is shown in table 2.

In conclusion, Funes and Portnoy (*5*) say: "In this group of 151 children, 14 years of age or less, repeatedly examined during an adequate period of time, only 2 were considered as having syphilis. It is a well-known fact that malaria gives false-positive reactions; nevertheless, it is not possible that malaria is responsible for all the serologic reactivity observed, because many of the children who showed reactivity have negative smears and no clinical evidence of malaria."

Surveys (*6*) of children and adult groups in various parts of Guatemala, among Indian and Ladino groups, show similar discrepancies, as indicated in tables 3, 4, 5, and 6.

Table 7 illustrates the results obtained using a battery of seven tests in a general population survey in Guatemala. The battery consisted of two flocculation tests using lipoidal antigens, Kahn and Mazzini; three flocculation tests using cardiolipin antigens, VDRL, Kline, and Rein-Bossak; and the Kolmer complement-fixation test, using both lipoidal and cardiolipin antigens. There is essentially no difference in reactivity in the two types of antigens in the Kolmer complement-fixation tests. The reactivity of the three flocculation tests using cardiolipin antigens is very similar and approximates that of the Kolmer reactions.

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[4] The authors consider that the word "specific" should be used instead of "sensitive."

**Table 3.**—*Comparison of results of serologic tests among 277 Indian children, aged 6 to 14 years, from Totonicapan, Guatemala*

| Name of test | Total tests performed | Results | | | | | |
|---|---|---|---|---|---|---|---|
| | | Positive | | Doubtful | | Negative | |
| | | Number | Percent | Number | Percent | Number | Percent |
| Kahn | 273 | 9 | 3.3 | 16 | 5.9 | 248 | 90.8 |
| Mazzini | 277 | 11 | 4.0 | 37 | 13.4 | 229 | 82.7 |
| VDRL | 276 | 2 | .7 | | | 274 | 99.3 |
| Kolmer simplified | 274 | 2 | .7 | | | 272 | 99.3 |

**Table 4.**—*Comparison of results of serologic tests among 441 Ladino children, aged 5 to 14 years, from the highlands of Guatemala*

| Name of test | Total tests performed | Results | | | | | |
|---|---|---|---|---|---|---|---|
| | | Positive | | Doubtful | | Negative | |
| | | Number | Percent | Number | Percent | Number | Percent |
| Kahn | 436 | 26 | 6.0 | 22 | 5.0 | 388 | 89.0 |
| Mazzini | 440 | 33 | 7.5 | 63 | 14.3 | 344 | 78.2 |
| VDRL | 441 | 8 | 1.8 | 1 | .2 | 432 | 98.0 |

**Table 5.**—*Comparison of results of serologic tests among Ladino adults in Guatemala*

| Name of test | Total tests[1] performed | Results | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Positive | | Doubtful | | Negative | | Anticomplementary | |
| | | Number | Percent | Number | Percent | Number | Percent | Number | Percent |
| Kahn | 3,459 | 942 | 27.2 | 312 | 9.0 | 2,205 | 63.8 | | |
| Mazzini | 6,608 | 1,605 | 24.3 | 1,482 | 22.4 | 3,521 | 53.3 | | |
| VDRL | 8,227 | 1,347 | 16.4 | 246 | 3.0 | 6,634 | 80.6 | | |
| Kolmer simplified | 780 | 97 | 12.4 | 4 | .5 | 663 | 85.0 | 16 | 2.1 |

[1] The number of tests equals the number of persons examined.

**Table 6.**—*Comparison of results of serologic tests among adult Indians in Guatemala*

| Name of test | Total tests[1] performed | Results | | | | | |
|---|---|---|---|---|---|---|---|
| | | Positive | | Doubtful | | Negative | |
| | | Number | Percent | Number | Percent | Number | Percent |
| Kahn | 515 | 110 | 21.4 | 75 | 14.5 | 330 | 64.1 |
| Mazzini | 517 | 104 | 20.1 | 126 | 24.4 | 287 | 55.5 |
| VDRL | 518 | 53 | 10.2 | 11 | 2.1 | 454 | 87.7 |

[1] The number of tests equals the number of persons examined.

**Table 7.**—*Comparison of serologic results obtained with Kahn, Mazzini, Kolmer regular, Kolmer cardiolipin, VDRL, Rein-Bossak, and Kline tests in Guatemala*

| Name of test | Total tests performed | Results | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Positive | | Doubtful | | Negative | | Quantity not sufficient | | Anticomplementary | |
| | | Number | Percent | Number | Percent | Number | Percent | Number | Percent | Number | Percent |
| Kahn | 988 | 104 | 10.5 | 64 | 6.5 | 794 | 80.4 | 26 | 2.6 | ------ | ------ |
| Mazzini | 989 | 102 | 10.3 | 157 | 15.9 | 717 | 72.5 | 13 | 1.3 | ------ | ------ |
| Kolmer regular | 987 | 49 | 5.0 | 3 | .3 | 906 | 91.8 | 27 | 2.7 | 2 | 0.2 |
| Kolmer cardiolipin | 875 | 42 | 4.8 | 5 | .6 | 803 | 91.8 | 23 | 2.6 | 2 | .2 |
| VDRL | 991 | 49 | 4.9 | 10 | 1.0 | 917 | 92.5 | 15 | 1.5 | ------ | ------ |
| Rein-Bossak | 922 | 49 | 5.3 | 13 | 1.4 | 847 | 91.9 | 13 | 1.4 | ------ | ------ |
| Kline | 991 | 51 | 5.2 | 13 | 1.3 | 911 | 91.9 | 16 | 1.6 | ------ | ------ |

In November 1948, the Venereal Disease Research Laboratory in Guatemala City was converted into a training center with emphasis on the standardization of serologic tests for syphilis in Central America. This was a cooperative project of the Pan American Sanitary Bureau and the Ministry of Health of Guatemala. A program which included formal courses in serology for the chief technicians of the health departments of the Central American countries was undertaken.

In the summer of 1949, in order to see if a pattern of reactivity similar to that found in Guatemala existed in the other countries of Central America, the technicians who participated in the first class in serology offered by the training center were asked to add a test using cardiolipin-lecithin antigen, the VDRL slide test, to the routine tests performed in their laboratories and to submit the data to our laboratory for statistical analysis. Table 8 summarizes the results.

The results in Panama were similar to those in the United States and differed from those obtained in the rest of Central America. We do not have an explanation for this phenomenon now, but are hoping to clarify it somewhat by additional studies which are under way.

The fact that there is such a high incidence of presumably false-positive reactions in these countries has complicated the standardization program of the training center. In March 1949, Mahoney (7) wrote: "As the work of assembling the serology data collected by Drs. Cutler and Levitan progresses, it becomes evident that the standard Kahn and Mazzini methods are unfavorably influenced by some factors other than syphilis. The extent of this nonspecificity approximates 15 percent. Any effort to operate the test procedures at the same level of reactivity as is done in New York probably will be productive of an exceedingly large number of nonspecific positive reactions. To the best of our knowledge the Kolmer, with cardiolipin or lipoidal antigens, and the VDRL tests give the most consistent results. If practical, it would

**Table 8.**—*Comparison of reactivity of Kahn, Eagle, and VDRL tests in the Republics of Guatemala, El Salvador, Costa Rica, and Panama*

| | Total tests performed | Positive | | | Weakly positive | | | Negative | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Kahn | VDRL | Eagle | Kahn | VDRL | Eagle | Kahn | VDRL | Eagle |
| Guatemala | 1,073 | 24.3 | 12.11 | 21.4 | 7.64 | 5.13 | 5.96 | 68.0 | 81.9 | 73.5 |
| Salvador | 1,007 | 27.5 | 18.57 | ------ | 5.46 | 5.76 | ------ | 68.1 | 75.7 | ------ |
| Costa Rica | 1,295 | 28.0 | 14.52 | 32.2 | 5.56 | 8.80 | 9.80 | 66.4 | 76.7 | 58.0 |
| Panama | 1,899 | 12.38 | 10.01 | ------ | 2.69 | 3.69 | ------ | 85.0 | 86.3 | ------ |

appear advisable to stress the use of these methods rather than any of the lipoidal antigen methods, especially those which are known to be highly sensitive."

The policy of the Venereal Disease Laboratory and Training Center of Guatemala City has been to teach the serologists .and technicians from Central America to first, perform the standard approved tests for syphilis, as evaluated in the 1941 Washington Serology Conference, according to the latest published technics of the author serologists; and, second, to suggest that tests employing a cardiolipin antigen, and, if possible, the Kolmer test, be added to the existing routine in view of the apparently greater specificity of these tests as determined by the studies made in the Guatemalan laboratory.

Tests using cardiolipin antigens will for the first time have an official international evaluation at the International Serological Conference now being organized by the Subcommittee on Serology of the World Health Organization. It is expected that this conference will take place in Europe early in 1952. Test specimens will be collected from many parts of the world. This should aid in the selection of procedures to be used in different geographic areas, where the type of test performed determines to a large extent the degree of seropositivity encountered.

The high incidence of presumably false-positive reactions in Central America offers unusual opportunity for the investigation of an extremely important world health problem. Many factors are suspected of contributing to the occurrence of false-positive reactions and only through extensive research and careful consideration of differences due to race, geography, climate, diet, chronic infections, and insect infestations can these factors be determined. Serologic tests are being conducted on controlled groups who are being extensively studied by the Institute of Nutrition of Central America and its independent field teams by detailed physical, nutritional, hematological, and biochemical examinations. The data will be closely studied for suggestions as to the etiology of the presumably false-positive reactions.

## Summary

1. Statistical data have been presented showing the reactivity of tests for syphilis, using both lipoidal and cardiolipin antigens, in Central America.

2. Two clinical studies made by the Venereal Disease Research Laboratory of the Pan American Sanitary Bureau, with the aid of the United States Public Health Service, are reviewed.

3. The policy of the Venereal Disease Laboratory and Training Center of the Pan American Sanitary Bureau in Guatemala, Guatemala, in regard to tests to be used for the diagnosis of syphilis in Central America, is presented.

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# Venereal Disease Contact Investigation

## A Progress Report

Johannes Stuart, Ph. D.[1]

The development of improved methods of contact investigation in venereal disease control gives cause for real pride and satisfaction. In the period 1945–49, indices of contact investigation have increased by 75 percent (*1*). This improvement has been maintained in the indices that pay off: in the number of new cases and the number of lesion cases per 100 patients brought to treatment as a result of this process.

These improvements come at a most fortunate time—when decreases in the incidence of syphilis make the hitherto successful massive dragnet methods progressively less effective in finding cases per dollar spent. Blood testing and raising the index of suspicion through public information achieve their maximum effectiveness when syphilis is richly seeded through the population. But case finding through contact investigation is, theoretically at least, the tool which, like sonar, finds the submerged, hidden cases that lie ready to extend infection or to develop late disability and death.

Contact investigation is, like sonar, an expensive tool and requires, as does any precision instrument, very competent personnel for its operation. Possibly for this reason it has achieved only a limited success even in its improved form. However, since an immunizing agent for syphilis has not yet been discovered, contact investigation may become the connecting link between a control program and the residual syphilis in the population.

### The Brighter Side

One of the achievements leading to present limited successes has been the general adoption of similar forms for follow-up of contacts by most State and all military health authorities. These forms have had an immense conditioning effect. The existence of a generally accepted channel through which health departments can follow with almost equal facility the contacts of patients living in the same town or thousands of miles away has greatly stimulated effective contact investigation. Even more, it has encouraged many health departments to develop improvements of their own.

An example of the efforts that recently have been devoted to the improvement of the contact investigation form is the work that has been going on with Federal departments and agencies to amalgamate the separate contact report forms used by them. A single form has been evolved for use in contact reporting by the Army, Navy, Air Force, Coast Guard, Veterans' Administration, and the Public Health Service hospitals and relief stations.

The consolidation of civilian and military efforts to train good contact interviewers can be counted as another progressive step. If contact investigation is to succeed, it must be done well, especially in the initial process of contact interviewing. All the contacts must be obtained, wherever possible, with a wealth of identifying detail that will make subsequent location of the contact relatively easy and cheap.

To meet the need for trained interviewers, schools have been operated at several locations with sufficient patients for teaching purposes. Four hundred and seventy civilian students and 354 members of the armed services have been trained at these schools. In one of the schools presently in operation at Alto, Ga., arrangements are made to reimburse the students for their travel to and from the school. Bed and board are provided for students in residence. Twenty-nine States have participated in the program by sending students to the school at Alto.

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[1] Health Program Officer, Division of Venereal Disease, U. S. Public Health Service.

Table 1.—*Activities of interviewer training schools (as of Dec. 31, 1950)*

| | Total | Location of school | | |
|---|---|---|---|---|
| | | District of Columbia | Norfolk, Va. | Alto, Ga. |
| Students trained, total | 824 | 166 | 315 | 343 |
| Civilian | 470 | 43 | 97 | 330 |
| Military | 354 | 123 | 218 | 13 |
| Contact index | 5.51 | 3.98 | 6.42 | 5.65 |
| Epidemiologic index | 1.40 | 1.17 | 1.83 | 1.14 |
| Brought-to-treatment index | .67 | .55 | .71 | .71 |
| Lesion-to-lesion index | .34 | .30 | .35 | .36 |
| Percent of contacts examined | 71 | 69 | 64 | 80 |

Interviews at these schools have uncovered an average of five and one-half sexual contacts per patient with primary or secondary syphilis. Instructors obtain, on the average, one more contact per patient than students. Reinterview adds one additional contact to the average number obtained per patient.

These high contact indices have paid off in locating patients with previously undiscovered syphilis and placing them under treatment. Examination of table 1 shows that two new cases of previously untreated syphilis are brought to treatment for every three patients interviewed in the schools, and that half of these cases are in the infectious stages. This is about a 50-percent better performance than the average of 15 areas reporting contact investigation indices (*1*).

This high level of performance is closely associated with the high average number of contacts obtained. Table 2 illustrates this association by showing the percentage of return by contacts in the order in which they were mentioned by patients. It will be noted that the first four contacts mentioned by patients accounted for only two-thirds of the total number infected and brought to treatment, and that a third of the school's contribution to the location of infected and previously untreated syphilis was made through the elicitation of the fifth and subsequent contacts.

High levels of achievement by widely separated health jurisdictions are a third encouraging accomplishment and demonstrate that effectiveness in the field of contact investigation is not a function of

### Indices (2)

***Contact index:*** The ratio of the number of contacts obtained to the number of patients diagnosed with previously untreated primary or secondary syphilis.

***Epidemiologic index:*** The ratio of the number of infected persons identified through contact investigation to the number of patients diagnosed.

***Brought-to-treatment index:*** The ratio of hitherto unknown cases found through contact investigation to the original patients available for interview.

***Lesion-to-lesion index:*** The ratio of contacts with primary or secondary syphilis brought to treatment as a result of contact investigation to patients with primary or secondary syphilis.

Table 2.—*Percentage distribution of cases found infected and percentage distribution of cases brought to treatment by order in which patients named their contacts*

[Hampton Roads Medical Center, Norfolk, Va., September 1949–June 1950]

| Order in which patients named their contacts | Infected with syphilis | | Brought to treatment for syphilis | |
|---|---|---|---|---|
| | Number | Percent | Number | Percent |
| All contacts named | 274 | 100 | 107 | 100 |
| First contact named | 71 | 26 | 22 | 21 |
| Second contact named | 56 | 21 | 30 | 28 |
| Third contact named | 26 | 9 | 11 | 10 |
| Fourth contact named | 30 | 11 | 8 | 7 |
| Fifth and subsequent contacts named | 91 | 33 | 36 | 34 |

geography, race, degree of urbanization, the availability of public clinics, or the prevalence of syphilis in the general population.

Western States like Oregon and eastern States like South Carolina have made high scores in the epidemiologic return from their cases of infectious syphilis. Colorado is a mountain state which, like Georgia and Alabama in the South, stands high in contact investigation. The District of Columbia and Denver are urban areas that can point with pride to their epidemiologic results. Nor can the scarcity of public clinics prevent efficient epidemiology, for in West Virginia and in Idaho we have found that almost comparable results can be obtained through working with the patients of private physicians as is obtained in public clinics. For example, in one area of West Virginia, where a cooperative relationship was established with all the private physicians, contact investigation netted a contact index of 2.7 and an epidemiologic index of 0.91.

A fourth evidence of progress again comes from the military services. Their emphasis on training of epidemiologic workers has increased their contact indices. The Navy, for example, reports a 90-percent increase in this index in its Fifth Naval District after the installation of trained contact interviewers (*3*). The armed services find gonorrhea to be their greatest source of venereal disease and over-all epidemiologic return to them is largely correlated with the willingness of civilian health departments to follow gonorrhea contacts. For this and other reasons, less than 10 percent of the contacts reported by the Navy to some States are located, but almost half of those reported to other States are found. As civilian health departments extend their cooperation and become increasingly successful in locating reported contacts, examining them, and bringing them to treatment, greater impetus should be given to this cooperative case-finding effort.

So much for the bright side of the picture. There is also a gloomy side which should be considered.

## The Problems Ahead

First, we should realize that there are difficulties in carrying out venereal disease epidemiology which should be recognized and taken into account.

One of these is our prejudice against the telltale, or the stool pigeon, which is expressed in our reluctance to ask and answer questions about sex partners. Another is the barrier of habit and language between the sexually unrestricted group in which syphilis is commonly found and the group whose function is venereal disease control. This barrier prevents ease of communication between the patient and the contact investigator.

Third is the procedural difficulty of contact investigation. It deals with a complicated chain of actions which involves many different workers. A slight error at one point may negate the value of all the effort which is expended.

More basic is the fact that contact investigation is not realizing its potential. Review of contact investigation activities as reported in the Statistical Letter (*1*) indicates that only 65 percent of the contacts reported by patients ever came to examination. It is also apparent that the level of contact investigation in many areas did not even begin to approach that of the most efficient performance.

Most serious of all is the fact that in many areas contact investigation appears to fizzle out long before all of the syphilitic chains have been uncovered and broken. That is, in the period following intensive epidemiologic work, early infectious syphilis still keeps on turning up. In most of these same areas there appears to be no economic justification for mass testing or widespread programs of public appeal.

With decreasing incidence of venereal disease, the whole of the United States will soon be in a similar position. Looking to the present for some areas and to the immediate future for all areas, consideration might be given to adding such elements to the contact investigation process as would increase its scope. These added elements should be chosen and tested in the most objective and pragmatic way.

## Widening the Search

One such element is based on the proposition that the cases of syphilis in any area are largely contained in a universe of interlinked individuals, a syphilitic stratum. If this is true, then interviews for the sexual contacts of any individual in the stratum might be remunerative in finding venereal disease. There is already some confirming evidence of this hypothesis.

In North Carolina some years ago, patients with infectious syphilis were queried for contacts (*4*). After the completion of contact interviewing, these patients were asked if they thought that any of their friends or companions would benefit from an examination for syphilis. The suspects named also proved to have a high percentage of syphilis.

Preliminary findings of a study (*5*) made by the State of Michigan indicate that the period of sex history covered in the contact interview may profitably be extended. In this study, a group of patients were interviewed for their sexual contacts over a period extending much further back than the time usually covered in contact interviewing. Though there may be some question as to the advisability of this time extension in terms of the incubation period, the fact is that this method uncovered cases which otherwise would not have been found.

Perhaps a trial of epidemiologic operation to include contact investigation on groups not previously covered would help to increase the efficiency of contact investigation. The groups outlined below do not include all the possibilities, nor is there assurance that they would all be profitable. However, such trials might include investigation of:

1. Sexual contacts of all syphilis patients discovered, regardless of stage (interviewing to cover 1 year prior to admission for treatment).
2. Noninfected sexual contacts of primary, secondary, and early latent syphilis patients (interviewing to cover a period of 1 year).
3. Sexual contacts of all syphilis and gonorrhea patients treated during the preceding year (interviewing to cover the time from their last interview to date).
4. Suspects such as: (*a*) other sex partners of patient's contacts; (*b*) friends and acquaintances associated with patient or contact in sexual activity; (*c*) friends and acquaintances of patient or contact with suspicious symptoms; (*d*) persons known by patient or contact to be frequently exposed to syphilis, such as prostitutes, pimps, members of gangs whose objectives include various kinds of sexual activity, conspicuous homosexuals, etc.

These field trials might demonstrate the existence and location of such strata of infection as still exist in many communities. They might add to the intimate and personal knowledge of the investigators whose working hours are spent in the homes and haunts of the infected, thus supplying direction for selective mass screening as well as making its own case-finding contribution to the discovery of venereal disease.

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# CURRENT NOTES AND REPORTS

## Failure of Stored Syphilitic Blood to Transmit Syphilis: A Case Report

**Nobel Guthrie, M. D.**[1]

On September 12, 1950, a man presented himself in the Eve Hall Clinic, Memphis-Shelby County Health Department, with a genital lesion which was clinically characteristic of primary syphilis. Darkfield examination was positive for motile spirochetes fulfilling the morphologic criteria for *Treponema pallidum.* During the interview for contact information, the patient volunteered the fact that he had recently given blood at the John Gaston Hospital Blood Bank.

Upon checking with the blood bank it was learned that this patient was bled on August 8, 1950, at which time his serologic test for syphilis was negative. This blood (500 ml.) was drawn into 100 ml. of a solution containing sodium citrate 1.6 gm., citric acid 0.56 gm., and anhydrous dextrose 1.5 gm. It was stored at 2° to 4° C. until August 17, 1950. On this date it was given intravenously to a young woman in labor, 2 hours before delivery. There was no reaction to the blood.

Further questioning of the donor revealed the following story. He had been married for several years, and denied extramarital sexual contact between October 1949 and July 19, 1950. On the latter date he had a single exposure to a woman whose name he did not know. As this exposure occurred in a city with which the donor was unfamiliar, no contact investigation could be made. Four days later, on July 23, gonorrhea developed and was controlled immediately with one injection of penicillin. A genital lesion developed on August 22, 32 days after exposure and 14 days after the blood was donated. This was the lesion which was diagnosed as primary syphilis on September 12. The donor's wife was physically and serologically negative on September 13, 1950. She was given prophylactic therapy (*1*) consisting of 900,000 units of procaine penicillin G in oil containing 2 percent of aluminum monostearate, and 360 mg. of bismuth salicylate intramuscularly.

It seems certain that the donor was in the incubation period of syphilis when blood was given. Though the presence of *T. pallidum* in this blood cannot be proved, it seems highly probable. The effect of the single injection of penicillin on July 23 is difficult to evaluate.

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The recipient of this blood left Memphis immediately following discharge from the hospital. After some difficulty, she was located and serologic tests were secured on her and on the child which had been delivered 2 hours following the transfusion. Both blood specimens taken December 11, 1950, were examined in the Mississippi State Laboratory and were reported negative. Indispensable assistance in the follow-up examination of the recipient and her child was rendered by Dr. R. L. Wyatt, Director, Marshall-Benton Health Department, Holly Springs, Miss., and Dr. R. L. Cobb, Director, Hardeman County Health Department, Bolivar, Tenn. Since 4 months had elapsed following the transfusion, the negative serologic status of the recipient and her child was considered to be reliable evidence that syphilis was not transmitted.

## Discussion

The problem of survival of *T. pallidum* in stored citrated blood has been studied by Bloch (*2*), Turner and Diseker (*3*), and Kolmer (*4*). Although these investigators employed slightly different methods the results were similar. After inoculated blood was stored longer than 96 hours, syphilis could not be transmitted to rabbits.

This case is reported because it is a human experiment of a type seldom observed. The essential facts are fairly well established. It is reasonable to assume that the blood was infectious when drawn, but after 9 days' storage, failed to produce syphilis when injected into a presumably susceptible recipient.

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# WHO Report Published

"Any sound venereal disease activity is dependent to a major degree upon the efficient conduct of serologic tests for syphilis." The World Health Organization Subcommittee on Serology and Laboratory Aspects, at its second session, endorsing this opinion expressed by its parent committee—the Expert Committee on Venereal Infections and Treponematoses—agreed that its chief function was to advise WHO on those activities which might contribute to the more efficient and uniform conduct of serologic tests for syphilis, both nationally and internationally.

The subcommittee reviewed the steps already taken by WHO for the holding of an International Serodiagnostic Laboratory Conference. The development during the past year of freeze-drying technics for the preparation of serums used in the standardization of various products and methods has given rise to the hope that freeze-dried syphilitic serums may be prepared without loss of their serologic properties. To determine whether freeze-dried serums are suitable for complement-fixation and flocculation tests, a pilot study is to be carried out in seven laboratories in different parts of the world. Should this study prove successful, attempts to achieve the international standardization of serologic laboratory procedures may be viewed in a new light. Further decisions on the conference have, therefore, been postponed until the results of the pilot study are available.

The production and control of cardiolipin and lecithin used as antigen components is a vital problem today. Production in soft-currency countries should be encouraged. Suggestions were made by the subcommittee for establishing a strict control of the purity of the products: monographs on cardiolipin and purified lecithin should be included in the *Pharmacopoea Internationalis;* international standards of cardiolipin and lecithin should be established; and laboratories should be selected to help the New York State Department of Health—the original patent holder for cardiolipin production—control the purity of these products throughout the world. The laboratories chosen should include at least one in a tropical or subtropical region, and should continue research on recently discovered substances, such as sitolpin, which may also prove suitable for use in the serodiagnosis of syphilis.

Technical advances relating to treponematoses other than syphilis were also examined. Data made available by WHO teams to the International Treponematosis Laboratory Center in Baltimore, Md., are proving valuable in the comparative study of the biologic and immunologic characteristics and relationship of the treponemal diseases and their causative agents. Further research on the applicability of the Nelson test to the diagnosis of syphilis should be carried out.

Other problems examined by the subcommittee were criteria for the selection of tests for use in mass serologic examinations, and the best system of notation to be employed.

A limited number of copies of this report by the second session of the Subcommittee on Serology and Laboratory Aspects held in Paris, September 23–October 2, 1950, is available upon request to Dr. Theodore J. Bauer, Chief, Division of Venereal Disease, United States Public Health Service, Washington 25, D. C. This publication is Number 33 of the WHO Technical Report Series. The report of the first session of the Subcommittee, No. 14 of the same series, is also available upon request.

## Geriatrics Bulletin To Be Issued By FSA

The Federal Security Agency announces establishment of a new bulletin, *Aging*, devoted to the field of geriatrics. Groups, organizations, and communities across the country are trying to obtain better understanding of the effects of our aging population and to devise programs that will enable older people to maintain useful and satisfying roles. This bulletin represents an experiment in supplying a clearinghouse for information that may be useful in reaching these objectives. Mr. Clark Tibbitts, Chairman of the Federal Security Agency's Committee on Aging and Geriatrics, has expressed the hope that the new bulletin will help to meet the need expressed before and during the recent Conference on Aging, and, more insistently, since that time.

*Aging* will not be issued on any regular schedule. Requests for copies of the first issue and subsequent issues should be addressed to the Office of Publications and Reports, Federal Security Agency, Washington 25, D. C.

# CURRENT LITERATURE

### Acta genetica et statistica med., Basel

Mortality in Norwegian mental hospitals 1926–1941. Ørnulv Ødegård. Acta genetica et statistica med., 2 : 141–173, Fasc. 2, 1951.

A study of 21,522 first admissions to Norwegian mental hospitals confirms previous findings of a very high excess mortality in these patients, with the highest mortality in patients with tuberculosis and respiratory and infectious diseases. This excess mortality is particularly high in psychoses which are accompanied by some somatic disorder, such as confusional, organic, and epileptic psychoses, as well as general paresis. Numerous statistical tables are presented on the mortality of the insane, according to age, sex, and duration of hospital stay, diagnosis (including general paresis), and cause of death.

### Am. J. M. Sc., Philadelphia

Terramycin: clinical, pharmacologic, and bacteriologic studies. Robert J. Sayer, Jean C. Michel, Frederic C. Moll, and William M. M. Kirby. Am. J. M. Sc., 221 : 256–263, Mar. 1951.

A report is presented of results of terramycin therapy in 108 patients with various infections commonly encountered on the adult and pediatric medical wards of a general hospital. The study included 1 patient with acute gonococcic urethritis. In this patient marked symptomatic improvement was noted within 12 hours after the administration of 1 gm. of terramycin. He was given another gram the next day, and cultures thereafter were negative.

### Am. J. Obst. & Gynec., St. Louis

A study of four hundred seventy-five pregnancies in American Indian women. Charles S. McCammon. Am. J. Obst. & Gynec., 61 : 1159–1166, May 1951.

A study of 475 pregnancies in American Indian women, mostly full-blooded Navajo Indians, is presented. Those studied were all hospital patients and were delivered at the Navajo Medical Center between July 1, 1948, and August 31, 1950. Of the systemic diseases complicating pregnancy, syphilis was the most prevalent with an incidence of 6.9 percent; however, there were only two fetal deaths attributed to untreated maternal syphilis. There were three neonatal deaths in the group. Of these infants, two were premature by weight and one of these also had congenital syphilis.

### Am. J. Ophth., Chicago

The trachoma-psittacosis-lymphogranuloma venereum group of viruses: the Chlamydozoaceae. Phillips Thygeson. Am. J. Ophth., 34 : 7–34, May 1951. (Part II.)

An extensive review of the literature on the history, diagnosis, and treatment of lymphogranuloma venereum, inclusion conjunctivitis, and trachoma is presented.

### Ann. Rheumat. Dis., London

Heberden Society. Annual Report, 1950. Clinical Meeting. Ann. Rheumat. Dis., 10 : 80–81, Mar. 1951.

At a meeting of the Society held at Westminster Medical School on January 24, 1951, five case reports were presented. One of these involved a 20-year-old girl with Reiter's syndrome which failed to respond to cortisone therapy. The girl had a history suggestive of Neisserian infection, although all investigations were consistently negative.

### Ann. West. Med. & Surg., Los Angeles

Clinicopathologic conference. Benjamin E. Konwaler and Donald W. Leik. Ann. West. Med. & Surg., 5 : 497–500, May 1951.

At this conference the case report of a 50-year-old sheet metal worker with syphilitic aneurysm involving the abdominal aorta and resulting in his death was discussed. The aneurysm had eroded the vertebral bodies in the lumbar region and had finally ruptured to cause a massive retroperitoneal and intra-abdominal hemorrhage. It is interesting in that it simulated tuberculosis of the spine.

### Antibiotics & Chemotherapy, New York

The present status of antibiotic therapy. Harry F. Dowliug. Antibiotics & Chemotherapy, 1 : 2–6, Apr. 1951.

This is a general discussion on the therapeutic uses of antibiotics, singly and in combinations, prophylaxis, deleterious results accompanying their administration, and some unsolved problems in the use of these drugs in the treatment of various infections, including venereal diseases.

Terramycin in the treatment of yaws. Elmer H. Louglin and Aurele A. Joseph. Antibiotics & Chemotherapy, 1 : 76–87, Apr. 1951.

A report is presented of an investigation begun in April 1950 for the purpose of evaluating the effectiveness of terramycin in the treatment of yaws. In the study, conducted at the Experimental Yaws Center of the Service Cooperatif Inter-Americain de la Sante Publique, Gressier, Haiti, 150 West Indian patients were observed. Dosage schedules, therapeutic results, and toxic reactions are discussed in detail. Authors feel that it is too soon to evaluate these cases except to state that clinical arrest of the disease has been obtained in each patient.

Chloromycetin as a treatment for yaws and tropical ulcer. Eugene H. Payne, Athemas Bellerive, and Lafont Jean. Antibiotics & Chemotherapy, 1 : 88–91, Apr. 1951.

After a brief review of the literature, treatment of two groups of patients with yaws and tropical ulcers is described. From the results, the authors conclude that clinical manifestations of yaws and tropical ulcer are favorably influenced by Chloromycetin administered orally, intravenously, or in combination and that further study of this drug should be encouraged.

Placental transmission of penicillin following single injections of procaine penicillin G in oil with 2 percent aluminum monostearate (300,000 units); maternal and cord blood concentrations. D. K. Kitchen, M. D. Speiser, H. J. Spoor, C. R. Rein, and E. W. Thomas. Antibiotics & Chemotherapy, 1 : 110–112, May 1951.

In this study, the maternal and cord serum penicillin concentrations were measured in 181 normal women at Bellevue Hospital who delivered their babies within 15 hours after the injection of 300,000 units of penicillin. The results showed that transfer trends may be anticipated, cord penicillin apparently paralleled the maternal but was at approximately one-third the level, and most favorable transfer was obtained when the penicillin had been injected between 6 and 12 hours prior to delivery.

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### Australian & New Zealand J. Surg., Sydney

Gumma of the lung. M. P. Susman. Australian & New Zealand J. Surg., 20 : 235–237, Feb. 1951.

Case history of a 40-year-old male complaining for 2 years of abdominal discomfort, fatigue, cough with a little mucoid sputum, and occasional pain in the chest, is presented. A Wassermann blood reaction was found to be positive, and a tumor removed from the right lung was diagnosed by a pathologist as almost certainly a gumma, the only other possibility being a chronic inflammatory lesion of unknown origin.

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### Brit. J. Phys. Med., London

The hypertherm in medicine. A. J. King. Brit. J. Phys. Med., 14 : 52–56, Mar. 1951.

The literature is reviewed and the use of pyrexia in treating infections, including those due to venereal diseases, is considered. Methods of inducing pyrexia, technic of application, untoward effects of hyperthermy, and results of pyrexial treatment with the hypertherm are considered.

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### Brit. J. Ven. Dis., London

V. D.—some random reflections of a venereologist. Robert Lees. Brit. J. Ven. Dis., 26 : 157–163, Dec. 1950.

In this address, delivered to the Medical Society for the Study of Venereal Diseases on July 28, 1950, author discusses the advantages and disadvantages of specializing in venereology, organization of venereology in the National Health

Service, military venereal disease services, prevention of venereal diseases, and the future of venereal disease as a specialty.

The contemporary male defaulter. Gordon O. Horne. Brit. J. Ven. Dis., 26: 164–171, Dec. 1950.

In this study on male defaulters, the material was taken from records of the clinic at Edinburgh from January 1948 to March 1950. Tables are presented showing default rate by stage of disease and mode of treatment, rate by marital state, age group, and occupation, and rate by previous history of venereal disease. Evidence justifies the modern tendency to emphasize case finding rather than case holding.

Complement-fixation technique. III. The Wassermann reaction. I. N. Orpwood Price. Brit. J. Ven. Dis., 26: 172–173, Dec. 1950.

A description of the test as employed at the Whitechapel Clinic and the Venereal Diseases Reference Laboratory is given. No hemolysis in the serum diagnostic tube with complete hemolysis in the serum control tube is read as a positive serum. Complete hemolysis in both tubes is read as a negative reaction.

Treatment of syphilis with penicillin. Review of 123 cases treated in H. M. Forces. Robert Lees and Leslie Watt. Brit. J. Ven. Dis., 26: 174–176, Dec. 1950.

Records of 123 men who had early syphilis while in service and who were treated with penicillin were obtained. Periods of observation are shown in table form. From these it was shown that an observation period of at least 2 years is essential before any claim for cure can be made. Eight case histories, recorded in detail, show difficulty in distinguishing between relapse and reinfection.

Viruses and venereal disease. S. P. Bedson. Brit. J. Ven. Dis., 26: 177–182, Dec. 1950.

Viruses pertaining to venereal diseases are discussed as to size, cultivation, and inclusion bodies. The virus of lymphogranuloma venereum is included as well as the viruses of inclusion blennorrhea, and herpetic infection.

Therapeutic paradox from penicillin therapy in laryngeal syphilis. Report of a case. A. I. Suchett-Kaye. Brit. J. Ven. Dis., 26: 183–184, Dec. 1950.

Case history is presented of a 34-year-old man who complained of general malaise, sore mouth and throat, dysphagia, and rectal discharge. Following an intensive course of penicillin treatment, signs of laryngeal involvement appeared. Cause was considered to be due to scarring and deformity as a result of the rapid healing of the syphilitic lesions in the epiglottis and vocal cords.

Arsenical encephalopathy occurring in the treatment of lues during pregnancy. Robert Lees and J. R. G. Buchanan. Brit. J. Ven. Dis., 26: 185–186, Dec. 1950.

Two case histories of arsenical encephalopathy in pregnant women are presented. Both women died. The authors advocate that such women should be treated with penicillin and bismuth, and Mapharside and neoarsphenamine should not be administered during pregnancy.

World health and treponematoses. Thorstein Guthe and Frank Reynolds. Brit. J. Ven. Dis., 27: 1–19, Mar. 1951.

The problem of world control of the treponemal diseases is discussed. From a global viewpoint, regional achievements in syphilis control are limited in value, since large reservoirs of syphilis and other treponemal diseases remain in areas throughout the world. The part that WHO has played in attempting to combat this problem is reviewed.

Late syphilis of the liver treated with penicillin. C. S. Nicol and R. B. Terry. Brit. J. Ven. Dis., 27: 20–22, Mar. 1951.

Case history is presented of a 53-year-old man with active gummatous hepatitis. Three years after penicillin treatment was started, he was able to work. As yet, there is no evidence of hypersplenism.

Cardiolipin antigen. I. A qualitative examination of sensitivity and specificity. Henning Schmidt. Brit. J. Ven. Dis., 27: 23–33, Mar. 1951.

The experiences of other writers with the cardiolipin antigen are summarized, and the technic used in the State Serum Institute at Copenhagen is described. Investigations made by the author comprise 1,322 blood samples divided into various groups according to clinical and anamnestic data. Preliminary results seem to corroborate opinions of other investigators that cardiolipin antigen is both sensitive and specific. Final conclusion is deferred, pending examination of further material.

Chemotherapy of venereal diseases. Its uses and abuses. Robert Lees. Brit. J. Ven. Dis., 27 : 34–37, Mar. 1951.

The history of venereal disease shows examples of the development and abuse of chemotherapy. Some common abuses are treatment without accurate diagnosis, treatment without efficient test of cure, overdosage with penicillin, neglect of ancillary treatment, and reckless use of antibiotics for the prevention of infection. The antibiotics are discussed.

Chemotherapy of venereal diseases. Its uses and abuses. S. M. Laird. Brit. J. Ven. Dis., 27 : 38–40, Mar. 1951.

Factors concerned in the application of chemotherapy are the efficacy of the drug, the virulence of the organism, and the natural defensive powers of the patient. The infective agent must be identified bacteriologically and its sensitivity to chemotherapeutic agents determined. After determining which chemotherapeutic agent to use, other factors to be considered are method of administration, dosage, frequency, patient's general condition, and epidemiologic investigation of intimate contacts. Observance of these principles constitutes proper use of chemotherapy; their nonobservance means its abuse.

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BRIT. M. BULL., LONDON

Serological control of venereal diseases. I. N. Orpwood Price. Brit. M. Bull., 7 : 204–206, No. 3, 1951.

This is a general discussion of preventive and public health measures, individual methods of treatment, complement-fixation tests for syphilis, gonorrhea, and lymphogranuloma venereum, and various precipitation tests for syphilis, as parts of a venereal disease control program.

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BRIT. M. J., LONDON

Degeneration, necrosis, and fibrosis in the liver. J. Henry Dible. Brit. M. J., No. 4711 : 833–841, Apr. 21, 1951.

In these two lectures, delivered at the Royal College of Physicians of London, the importance of fatty infiltration as a cause of cirrhosis and the characteristic features and points of similarity and difference between various types of cirrhosis, including that due to syphilis, are discussed.

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BULL. VANCOUVER M. A., VANCOUVER

The care of children's eyes. Meyer Wiener. Bull. Vancouver M. A., 27 : 125–128, Feb. 1951.

In discussing the various conditions which affect the eyes of children, the author mentions gonorrheal ophthalmia and interstitial keratitis due to syphilis. The latter condition is rarely seen now, and gonorrheal ophthalmia is much less serious than in former years now that we have antibiotics.

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CALIFORNIA'S HEALTH, SAN FRANCISCO

Georgia modifies premarital law. California's Health, 8 : 167, May 15, 1951.

Recent session of the State Legislature of Georgia amended the premarital law so as to authorize the ordinaries, who issue marriage licenses, to accept properly executed premarital certificates from other States which require a blood test for syphilis, and similar certification by a physician regarding the disease as required by the Georgia law.

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CHICAGO M. SOC. BULL., CHICAGO

The current clinical usage of antibiotics. Perrin H. Long. Chicago M. Soc. Bull., 53 : 869–873, May 12, 1951.

In this paper, use, dosages, and effectiveness of the antibiotics in the treatment of various infections, including the venereal diseases, are discussed from the standpoint of the general practitioner.

### CHRON. WORLD HEALTH ORGAN., GENEVA

1950: Year of co-operation. Annual report of the Director-General. Chron. World Health Organ., 5: 101–115, Apr. 1951.

Activities of WHO as a coordinating agency in international health work are reviewed. Efforts to control venereal diseases were continued, consolidated, and expanded during the year. Consultant services were made available to 15 countries.

Venereal diseases and treponematoses. Notes and News. Chron. World Health Organ., 5: 118–120, Apr. 1951.

Projects already under way in Ecuador, Egypt, Iraq, and Haiti are discussed. In Ecuador, the project is an 8-month campaign in syphilis control.

### CIRCULATION, BALTIMORE

Polyarteritis nodosa. A correlation of clinical and postmortem findings in seventeen cases. George C. Griffith and I. Lutfi Vural. Circulation, 3: 481–491, Apr. 1951.

A study is reported of 17 cases of polyarteritis nodosa, including 16 cases seen among 19,242 autopsies performed in the Los Angeles County Hospital between 1939 and 1948 and 1 additional case taken from the files of Birmingham Veterans' Administration Hospital. There was a past history of syphilis in 3 patients, while laboratory findings showed that 2 of them had a positive Wassermann reaction in the serum and a negative cerebrospinal fluid. One patient had a positive Kahn reaction in the serum and a negative Wassermann. At autopsy none showed changes due to syphilis. Detailed clinical and pathologic data are presented.

### FERTILITY & STERILITY, NEW YORK

Differential diagnosis in male sterility. With consideration of the role of endocrine therapy. R. Palmer Howard, Fred A. Simmons, and Ronald C. Sniffen. Fertility & Sterility, 2: 95–114, Mar.–Apr. 1951.

Data on physical examination, seminal studies, urinary assays of gonadotropins (FSH) and 17-ketosteroids, and testicular biopsy are presented for 109 adult men with sterility seen at the Massachusetts General Hospital. Of this number, 33 men with azoospermia and normal testicular histology were diagnosed as having bilateral obstructions of the ductal system. Evidence of gonococcic epididymitis was present in 19 of these.

### INTERNAT. DIGEST OF HEALTH LEGISLATION, (WHO), GENEVA

Portugal. Control of communicable diseases. Internat. Digest of Health Legistian M. A., 34: 1–19, No. 1, 1951.

Act No. 2:036 of 9 August 1949 presents regulations for the control of communicable diseases, including venereal disease infections.

Yugoslavia. Control of venereal diseases. Internat. Digest of Health Legislation, (WHO), 2: 468–473, 1951.

General Instruction No. 471 of 17 June 1949 presents regulations concerning the notification, examination, treatment, and control of persons suffering from venereal diseases.

### J. PHARM. & PHARMACOL, LONDON

The chemotherapy of human virus infections. G. M. Findlay. J. Pharm. & Pharmacol., 3: 193–214, Apr. 1951.

An extensive review of the literature on chemotherapy of virus infections, including the treatment of the lymphogranuloma venereum-psittacosis group with the sulfonamides and the antibiotics, is presented.

### J. ROY. EGYPTIAN M. A., CAIRO

Heart disease in Egypt. Part I. Rheumatic heart disease. A. El-Sherif, A. Sorour, and M. Ibrahim. J. Roy. Egyptian M. A., 34: 1–19, No. 1, 1951.

Among a total of 486 cardiac patients, 258 were found to have rheumatic heart disease. Age and sex incidence, rheumatic history, symptomatology, and complicating and associated conditions of rheumatic heart disease are discussed. Clinical evidence of congenital syphilis and a positive Wassermann reaction were present in 1 patient; a positive history of syphilis was present in 4. Tabes dorsalis was probably present in 1. All of the patients with syphilis were males.

J. ROY. EGYPTIAN M. A., CAIRO—CON.

Heart disease in Egypt. Part II. Cardiovascular syphilis. A. El-Sherif, A. Sorour, and M. Ibrahim. J. Roy, Egyptian M. A., 34: 114–123, No. 2, 1951.

Age and sex incidence, history, clinical features, diagnosis, and prognosis of cardiovascular syphilis in 18 patients are discussed.

Penicillin treatment in syphilis. Fathi A. Soliman. J. Roy. Egyptian M. A., 34: 143–149, No. 2, 1951.

A statement on the treatment of syphilis with penicillin alone, made by the American Venereal Disease Association and sent to the WHO, is discussed. On the basis of this statement, the author feels that it is time for all physicians to start treating all patients with early syphilis with penicillin alone, safeguarded not only by the safety of this antibiotic but also by its effectiveness as clearly demonstrated by the work of leading venereal disease physicians in the United States.

LANCET, LONDON

Njovera: An endemic syphilis of Southern Rhodesia. Comparison with bejel. R. R. Willcox. Lancet, 1: 558–561, Mar. 10, 1951.

After a brief review of the literature, the clinical courses and incidence of njovera, an extravenereal syphilis encountered in certain parts of Southern Rhodesia, are discussed. A comparison of the disease with bejel in Iraq shows that they are similar, if not identical. Author believes that both conditions are, in fact, syphilis.

MD, NEW YORK

Review: Midwife practice and the prevention of ophthalmia neonatorum. Hugo Hellendall. MD, 6: 159–161, 182–185, May 1951.

From a review of the literature author concludes that the attendance of births by midwives in this country is still an important problem for boards of health, especially in regard to ophthalmia neonatorum. The prophylaxis with penicillin drops in the eyes of the newborn or with the subcutaneous injection of penicillin are not appropriate in the hand of the midwife. To improve the care given by midwives, more training centers for nurse-midwives and more maternity clinic centers are recommended.

M. J. AUSTRALIA, SYDNEY

Some observations on 100 cases of ankylosing spondylitis. L. J. A. Parr, Paul White, and Eva Shipton. M. J. Australia, 1: 544–549, Apr. 14, 1951.

Incidence and diagnosis of ankylosing spondylitis are discussed. Of the 100 male and female patients studied, 4 gave a history of gonorrhea. Authors think that the gonococcus is probably of no etiologic significance, unless it is a provoking factor or a common denominator of many probably associated factors of causation.

M. PRESS, LONDON

The modern treatment of syphilis and gonorrhoea during pregnancy. R. Marinkovitch. M. Press, No. 5827: 29–33, Jan. 10, 1951.

The author discusses the effect that sex may have on the natural course of syphilis and gonorrhea, as well as the effect of pregnancy on them. The diagnosis and treatment of these diseases in pregnancy are considered, together with the treatment of ophthalmia neonatorum and congenital syphilis in infants. A study of the records of 250 pregnancies in 200 women observed during the past 8 years at the Nottingham Clinics revealed that there were 218 treated and 32 untreated pregnancies. Of the 32 untreated syphilitic mothers not a single healthy child was delivered, while 214 healthy infants were produced by the 218 treated syphilitic pregnant women.

Some recent advances in the management of syphilis. T. E. Osmond. M. Press, No. 5840: 353–356, Apr. 11, 1951.

The development and use of penicillin in the treatment and prophylaxis of syphilis and gonorrhea are reviewed.

M. WORLD, LONDON

Abdominal tumours. P. H. Mitchiner. M. World, 73: 572–576, Feb. 16, 1951.

In discussing various abdominal tumors, the author includes gummas of syphilis, which may be single or multiple. These are seldom seen now, but when present are frequently associated with perihepatitis and perisplenitis and general enlargement and tenderness of both these organs, together with a strongly positive Wassermann and other manifestations of syphilis.

Fifty years in the changing panorama of disease in West Africa—1898–1948. Ernst Krueger and R. E. G. Armattoe. M. World, 74 : 70–74, Mar. 23, 1951.

Pathologic conditions common among the Ewe people of the Gold Coast and Togoland are discussed. While the venereal diseases were included among the commonest diseases in these two countries 50 years ago, recent examinations by the authors of the population in British and French Togoland showed 250 children under 15 years and 30 adults with yaws, 652 males and 312 females with gonorrhea, 10 with syphilis, and 6 with syphilitic aortitis.

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MED. ILLUSTRATED, LONDON

Granuloma inguinale in the African Negro. R. R. Willcox. Med. Illustrated, 5 : 67–70, Feb. 1951.

After a brief review of the literature, author discusses treatment of granuloma inguinale with streptomycin, aureomycin, and chloramphenicol. Observations were made on 17 of approximately 1,500 patients with venereal diseases examined in over 50 institutions during a 1949–50 survey in Southern Rhodesia. Four case illustrations are presented.

Radiological diagnosis of new growth of bone. James F. Brailsford. Med. Illustrated, 5 : 109–125, Mar. 1951.

In this paper, a brief account is given of alterations in radiographic characters, the factors responsible for these alterations, recognition of the causal factors, and radiographic evidence of malignancy. Radiographic alterations due to syphilis are described. The author warns that before making a diagnosis of Ewing's sarcoma every step should be taken to exclude syphilis. Failure to do so should be regarded as unjustifiable neglect, for the consequences are disastrous.

Aureomycin : a review. I. Jocelyn Patton. Med. Illustrated, 5 : 126–129, Mar. 1951.

The pharmacology and clinical use of aureomycin in the treatment of various infections, including the venereal diseases, are reviewed.

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MEMPHIS M. J., MEMPHIS

Use of ACTH and cortisone in ophthalmology. James Wilson. Memphis M. J., 26 : 56–57, Apr. 1951.

A brief review of the literature is presented. From personal observation, author reports that one case of interstitial keratitis, one of central chorioretinitis, and one of iritis, all due to syphilis, responded to treatment with cortisone.

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MINNESOTA MED., ST. PAUL

The dangers of penicillin therapy in syphilis of the central nervous system. With special reference to the occurrence of delayed reactions. Sidney K. Shapiro and Barnet Berris. Minnesota Med., 34 : 141–144, Feb. 1951.

In a study made at the University of Minnesota Medical School, Division of Neurology, 10 patients with neurosyphilis, 1 with tertiary syphilis of the skin, and 6 nonsyphilitic control patients were given a combination of graded intramuscular doses of penicillin and subsequent large doses of intravenous penicillin. Delayed reactions occurred in 8 of the 11 syphilitic patients and in 3 of the control group. Two patients succumbed after the institution of penicillin therapy. Case reports are presented for 4 patients, and possible explanations for the delayed reactions are discussed.

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MISSISSIPPI DOCTOR, BOONEVILLE

Trends in venereal disease control. A. L. Gray. State Board of Health. Mississippi Doctor, 28 : 425–426, May 1951.

National, State, and local venereal disease control programs are discussed. Author feels that Federal aid to a State should not be discontinued until after the State legislature has had an opportunity to consider the financing of a maintenance control program and with full knowledge that Federal support is to be discontinued.

MISSISSIPPI VALLEY M. J., QUINCY

Newer developments in cardiac therapy. Julius Jensen. Mississippi Valley M. J., 73: 46–47., Mar. 1951.

Among the recent changes in cardiology, the author mentions the decrease in syphilitic heart disease due to better control of syphilis with penicillin.

NEW YORK STATE J. MED., NEW YORK

Treatment of syphilis from the new drug standpoint: Changes necessary in handling the venereal disease patient. Bernard I. Kaplan and James Ryan. New York State J. Med., 51: 346–348, Feb. 1, 1951.

Report consists of personal observations made since 1938 on inmates with syphilis at prisons under the Department of Correction of the State of New York. Ambulatory courses of delayed absorption preparations of penicillin offered the best means of providing what seemed to be adequate therapy in all stages of the disease. Neither in latent nor in late syphilis have preliminary courses of bismuth administered in expectation of a Herxheimer reaction been found to be necessary. Failure to achieve seronegativity following therapy is no indication by itself of treatment failure.

Intravaginal penicillin therapy. R. I. Walter, M. A. Goldberger, and L. S. Lapid. New York State J. Med., 51: 937–939, Apr. 1, 1951.

In this study, a total of 35 patients was treated for trichomonas vaginitis, endocervicitis, and cervical erosions. Of 21 patients with trichomonas vaginitis, treated with vaginal suppositories of penicillin given once or twice daily for 7 to 28 days, 45 percent became *Trichomonas* negative. From the poor results in comparison to other forms of treatment and the high recurrence rate, authors conclude that penicillin is not to be recommended for the routine treatment of this infection.

NUTRITION REV., NEW YORK

Pyridoxine and thiamine therapy in disorders of the nervous system. Nutrition Rev., 9: 131–133, May 1951.

A review of the literature on the effectiveness of thiamine and pyridoxine in treatment of several degenerative and infectious disorders of the nervous system, including tabes dorsalis and neurosyphilis, is presented.

PENNSYLVANIA M. J., HARRISBURG

Observations in penicillin-treated cardiovascular syphilis. Joseph Edeiken, William T. Ford, and John H. Stokes. Pennsylvania M. J., 54: 229–233, Mar. 1951.

From personal experience based upon treatment of 111 cardiovascular syphilis patients with penicillin, authors feel that this type of therapy is the safest agent yet presented for use in this disease, and that congestive failure and angina pectoris are not contraindications to its use.

PHILADELPHIA MED., LANCASTER

The diagnosis and management of mouth cancer. Hayes Martin. Philadelphia Med., 46: 1321, 1323, May 19, 1951.

In this abstract of a paper read at Cancer Symposium, Committee on Cancer Control, Philadelphia County Medical Society, April 3, 1951, the differential diagnosis of mouth cancer is discussed. One of the conditions to be considered in the diagnosis is syphilis. Gumma or other ulcerated syphilitic lesions, while not clinically distinguishable from mouth cancer, are exceedingly rare. Since the two diseases may coexist, a positive serologic test for syphilis should never be depended upon to exclude the presence of cancer.

POST-GRAD. M. J., LONDON

Syphilis of the oral cavity. V. E. Lloyd. Post-Grad. M. J., 27: 177–184, Apr. 1951.

Syphilitic lesions of the lip, tongue, tonsils, and palate in the primary, secondary, and tertiary stages are described. In a personal study of 100 cases of ulceration in the palate, fauces, or pharynx, the author found no instance of simultaneous gummatous disease of the tongue.

POSTGRAD. MED., MINNEAPOLIS

Highlights in medical ophthalmology. Conrad Berens. Postgrad. Med., 9: 293–312, Apr. 1951.

A brief outline is presented of impor-

POSTGRAD. MED., MINNEAPOLIS—CONT.

tant eye symptoms, physical signs, and diseases seen by the ophthalmologist. Ocular infections due to syphilis and gonorrhea are included in the discussion. The ophthalmologist requires the cooperation of general physicians and specialists if he hopes to prevent blindness and cure the conditions he sees.

## PRACTITIONER, LONDON

The complications of varicose veins. J. B. Oldham. Practitioner, 166: 236–243, Mar. 1951.

In discussing the complications of varicose veins, the author considers ulceration. Included among the factors retarding healing of gross varicose ulcers is syphilis, and it is recommended that the Wassermann reaction be done in every case in which syphilis is suspected or when an ulcer is unduly slow in healing.

Chemotherapy of the venereal diseases. C. S. Nicol. Practitioner, 166: 353–360, Apr. 1951.

The literature is reviewed and the present routine clinic treatment of syphilis (acquired and congenital), gonorrhea, nongonococcic (abacterial) urethritis, chancroid, and lymphogranuloma venereum is described.

## PUB. HEALTH REP., WASHINGTON

Preservation of viability and pathogenicity of the Nichols rabbit strain of *Treponema pallidum* by freeze drying. Edward G. Hampp. Pub. Health Rep., 66: 501–506, Apr. 20, 1951.

A method for the preservation of viability and pathogenicity of the Nichols rabbit strain of *Treponema pallidum* when dried in vacuo from the frozen state is described, and results are given. Control samples of the experimental material were inoculated into rabbits prior to drying, immediately after freezing in a dry ice-methyl cellosolve bath, and after drying of tissues from the frozen state. In two instances all specimens remained infectious for rabbits.

Influence of irradiation and penicillin on experimental syphilis transmission. T. F. Probey. Pub. Health Rep., 66: 644–648, May 18, 1951.

In this study, the author found that transmission of experimental syphilis in rabbits by transfusion was not prevented by previous exposure of whole blood containing virulent *Treponema pallidum* to ultraviolet irradiation, or by crystalline penicillin G in large quantity, added 1 hour before transfusion.

## SOUTH DAKOTA J. MED. & PHARM., SIOUX FALLS

The diagnostic significance of some ocular complaints. P. J. Leinfelder. South Dakota J. Med. & Pharm., 4: 43–44, 47, Feb. 1951.

Among the general diseases responsible for visual loss, mention is made of syphilis. Formerly syphilis was the primary disease responsible for involvement of the optic nerve in inflammation or degeneration and affection of the arteries or of the retina in degenerative or thrombotic phenomena, and many patients were first diagnosed as having syphilis because of the ocular manifestations of this disease. As better therapeutic control of syphilis has been accomplished, however, optic atrophy and chorioretinitis have become less frequent in occurrence and less important as diagnostic signs.

## SOUTH. M. J., BIRMINGHAM

The Georgia plan of multiphase testing. C. D. Bowdoin. South. M. J., 44: 236–239, Mar. 1951.

The Greater Atlanta Survey, conducted from April 4 to June 30, 1950, is discussed and results presented. Of 228,266 persons tested for syphilis by the VDRL and Kahn technics, 22,395 (9.8 percent) were reactors. Of these, 14,317 (6.3 percent) were positive and 8,078 (3.5 percent) were weakly positive.

The ocular complications of arthritis. Derrick Vail. South. M. J., 44: 317–322, Apr. 1951.

In this paper inflammatory lesions of various parts of the eyeball associated with diseased and inflamed joints, including those caused by syphilis, gonorrhea, and Reiter's syndrome, are discussed.

# STATISTICS

## Cases of Syphilis and Gonorrhea Reported to the Public Health Service by State and Territorial Health Departments, July—September 1950

[Known military cases excluded]

| Federal Security Agency regions | Syphilis | | | | | | | | | | | | | | | Gonorrhea | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Primary and secondary | | | Early latent | | | Late and late latent | | | Congenital | | | Not stated | | | | | |
| | Total all sources | Ratio to prior quarter | | Total all sources | Ratio to prior quarter | | Total all sources | Ratio to prior quarter | | Total all sources | Ratio to prior quarter | | Total all sources | Ratio to prior quarter | | Total all sources | Ratio to prior quarter | |
| | | All sources | Private physician sources | | All sources | Private physician sources | | All sources | Private physician sources | | All sources | Private physician sources | | All sources | Private physician sources | | All sources | Private physician sources |
| Region 1—Total | 126 | .88 | .93 | 149 | .97 | 1.11 | 472 | .98 | 1.04 | 48 | .98 | 1.37 | 33 | .80 | *.95 | 945 | 1.15 | 1.16 |
| Connecticut | 28 | *1.12 | *1.08 | 72 | 1.06 | 1.26 | 84 | .93 | 1.11 | 13 | *1.08 | *1.43 | 14 | *1.75 | *1.60 | 206 | 1.19 | 1.14 |
| Maine | 28 | .61 | .56 | 17 | *.65 | *.40 | 37 | .70 | .61 | 2 | *.33 | *.50 | 0 | — | — | 86 | 1.02 | 1.07 |
| Massachusetts | 39 | .85 | *1.29 | 34 | .77 | *1.00 | 149 | .77 | 1.08 | 18 | *1.29 | *2.33 | 0 | — | — | 544 | 1.17 | 1.23 |
| New Hampshire | 5 | *1.67 | *1.67 | 4 | *4.00 | *4.00 | 36 | 1.16 | 1.03 | 7 | *1.75 | *1.75 | 1 | *1.00 | *1.00 | 26 | *2.60 | *2.60 |
| Rhode Island | 8 | *2.00 | *6.00 | 16 | *1.45 | *1.88 | 145 | 1.65 | 1.32 | 5 | *.45 | *.71 | 18 | .56 | *.75 | 54 | 1.00 | 1.10 |
| Vermont | 18 | *.90 | *.90 | 6 | *1.50 | *1.50 | 21 | *.78 | *.78 | 3 | *1.50 | *1.50 | 0 | — | — | 29 | .76 | .76 |
| Region 2—Total | 605 | .82 | .75 | 2,259 | 1.01 | 1.02 | 6,623 | .98 | 1.04 | 310 | 1.09 | 1.09 | 125 | .88 | 1.10 | 9,644 | 1.28 | 1.33 |
| Delaware | 10 | *.45 | *.45 | 56 | 1.56 | *1.72 | 52 | 1.27 | *1.37 | 5 | 2.50 | *3.00 | 27 | .57 | *.7 | 74 | 1.30 | *1.31 |
| New Jersey | 76 | .84 | .69 | 553 | 1.35 | 1.05 | 901 | .96 | .84 | 62 | 1.38 | *1.71 | 0 | — | — | 1,198 | 1.53 | 1.29 |
| New York | 325 | .83 | .77 | 975 | .94 | .93 | 4,679 | 1.02 | 1.07 | 158 | 1.04 | .98 | 98 | 1.03 | *1.91 | 5,602 | 1.27 | 1.41 |
| New York City | 271 | .80 | .76 | 936 | .95 | .92 | 3,872 | 1.00 | 1.05 | 113 | 1.01 | *1.28 | 90 | 1.02 | *2.14 | 4,808 | 1.29 | 1.56 |
| Pennsylvania | 194 | .82 | *.89 | 675 | .90 | 1.21 | 991 | .84 | 1.29 | 85 | 1.00 | *.50 | 0 | — | — | [a] 2,770 | 1.20 | .93 |
| Philadelphia | [a] 111 | .67 | *1.00 | [a] 413 | .83 | .80 | 493 | .68 | .85 | 35 | .95 | *.50 | 0 | — | — | 2,240 | 1.13 | .93 |
| Pittsburgh | 18 | *1.80 | *5.00 | 61 | 1.20 | *2.20 | 168 | 1.00 | *9.75 | 13 | 1.86 | — | 0 | — | — | 266 | 1.26 | — |
| Region 3—Total | 869 | .94 | .99 | 2,341 | .88 | .98 | 2,910 | .96 | 1.11 | 670 | .87 | 1.29 | 95 | .82 | .79 | 15,227 | 1.08 | 1.10 |
| District of Columbia | 36 | .84 | *.17 | 230 | 1.12 | *.50 | 549 | 1.19 | *1.55 | 12 | *.92 | — | 2 | *.67 | — | 3,833 | 1.16 | *.43 |
| Maryland | 103 | .67 | *.39 | 207 | .76 | .63 | 502 | .78 | 1.33 | 38 | .51 | *5.00 | 60 | .77 | .74 | 2,050 | 1.06 | 1.05 |
| Baltimore | 58 | .61 | *.29 | 119 | .71 | .68 | 331 | .67 | *1.25 | 17 | .46 | — | 57 | .74 | .68 | 1,710 | 1.02 | .87 |
| North Carolina | 269 | .91 | .69 | 549 | .97 | 1.35 | 242 | .77 | *1.26 | 82 | .96 | 0 | 0 | — | — | 3,767 | 1.03 | 1.22 |
| Virginia | 237 | 1.22 | 1.81 | 411 | .90 | 1.21 | 528 | 1.14 | 1.55 | 51 | .72 | *1.67 | 24 | *1.09 | *1.00 | 2,767 | 1.11 | 1.24 |
| West Virginia | 88 | .92 | .82 | 166 | .80 | .75 | 354 | .99 | .83 | 44 | 1.13 | *1.04 | 0 | — | — | 980 | 1.04 | 1.06 |
| Puerto Rico | 133 | .99 | — | 757 | .80 | — | 727 | .93 | — | 441 | .91 | — | 6 | *.60 | — | 1,805 | 1.08 | — |
| Virgin Islands | 3 | *.50 | — | 21 | *3.50 | — | 8 | *1.14 | — | 2 | — | — | 3 | *1.00 | — | 25 | .64 | 0 |
| Region 4—Total | 406 | .95 | 1.03 | 1,697 | .97 | .97 | 3,871 | 1.01 | .99 | 278 | .88 | 1.03 | 394 | 1.76 | 1.29 | 6,022 | 1.20 | 1.25 |
| Kentucky | 98 | 1.02 | *1.11 | 198 | .96 | .92 | 394 | .83 | .79 | 61 | 1.03 | *2.00 | 4 | *.36 | *.30 | 1,137 | 1.06 | 1.04 |
| Michigan | 151 | 1.10 | 1.38 | 541 | 1.05 | 1.15 | 1,331 | 1.08 | .85 | 64 | .74 | .89 | 390 | 1.83 | 1.35 | 2,343 | 1.22 | 1.34 |
| Ohio | 157 | .81 | .74 | 958 | .94 | .91 | 2,146 | 1.01 | 1.10 | 153 | .89 | 1.02 | 0 | — | — | 2,542 | 1.25 | 1.17 |
| Region 5—Total | 561 | .92 | .99 | 1,074 | .91 | .86 | 2,404 | .86 | .86 | 211 | 1.00 | .93 | 79 | 1.41 | 1.47 | 6,752 | 1.15 | 1.00 |
| Illinois | 379 | .95 | 1.04 | 698 | .89 | .82 | 1,387 | .87 | .82 | 106 | 1.04 | .98 | 0 | — | — | 5,641 | 1.17 | .98 |
| Chicago | 186 | .90 | .93 | 478 | .87 | .72 | 707 | .85 | .74 | 54 | 1.04 | *.91 | 0 | — | — | 4,595 | 1.20 | .81 |
| Indiana | 73 | .58 | .72 | 274 | .94 | .97 | 582 | .92 | .83 | 84 | 1.56 | 1.37 | 0 | — | — | 681 | 1.03 | 1.00 |
| Minnesota | 20 | *1.82 | *1.80 | 26 | *1.13 | *1.00 | 124 | .57 | 1.26 | 3 | *.18 | *.43 | 5 | *1.67 | — | 229 | .95 | .82 |
| Wisconsin | 89 | 1.16 | 1.07 | 76 | .84 | .82 | 311 | .88 | .90 | 18 | .49 | .56 | 74 | 1.40 | 1.40 | 201 | 1.20 | 1.79 |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Region 6—Total | 1,488 | .87 | .72 | 3,687 | .89 | .70 | 5,451 | .92 | .80 | 1,126 | .77 | .85 | 466 | .79 | .78 | 21,655 | 1.12 | 1.16 |
| Alabama | 212 | .83 | .80 | 677 | 1.21 | .70 | 585 | 1.75 | *.93 | 167 | 3.98 | *.50 | 448 | .78 | .77 | 1,239 | 1.15 | 1.34 |
| Florida | 302 | .68 | .54 | 939 | .91 | .77 | 1,117 | .97 | .95 | 121 | .93 | *1.25 | 0 | — | — | 3,989 | 1.04 | .99 |
| Georgia | 436 | 1.03 | 1.41 | 634 | 1.26 | 0 | 1,238 | 1.58 | *.91 | 225 | .48 | — | 0 | — | — | 4,070 | 1.18 | — |
| Mississippi | 235 | .96 | .76 | 487 | .51 | .43 | 1,463 | .58 | .51 | 440 | .73 | *.62 | 0 | — | — | 3,709 | 1.13 | 1.12 |
| South Carolina | 148 | .80 | *.89 | 625 | .92 | *3.67 | 519 | .94 | 1.12 | 55 | .53 | *1.00 | 0 | — | — | 2,454 | 1.11 | 1.16 |
| Tennessee | 155 | .95 | *1.25 | 325 | .75 | .61 | 529 | .94 | .66 | 118 | 1.04 | *.78 | 18 | *1.00 | *1.38 | 6,194 | 1.13 | 1.21 |
| Region 7—Total | 343 | .87 | .92 | 648 | .94 | 1.01 | 1,601 | 1.02 | 1.13 | 162 | 1.03 | 1.18 | 96 | 1.09 | 1.35 | 2,257 | 1.21 | 1.41 |
| Iowa | 68 | .93 | .82 | 87 | 1.09 | 1.11 | 316 | 1.17 | 1.05 | 30 | *1.07 | *.96 | 15 | *.71 | *.88 | 259 | 1.76 | 1.61 |
| Kansas | 45 | .64 | .65 | 120 | .98 | 1.04 | 345 | .99 | 1.23 | 20 | *.80 | *1.00 | 11 | *.69 | *1.43 | 348 | 1.12 | 1.12 |
| Missouri | 188 | .94 | 1.03 | 333 | .88 | .92 | 761 | .94 | 1.06 | 94 | 1.12 | *1.70 | 41 | *2.28 | *2.46 | 1,348 | 1.21 | 1.38 |
| St. Louis | 76 | .92 | 1.00 | 171 | .89 | .86 | 350 | .93 | .86 | 48 | *2.09 | *2.00 | 7 | — | — | 748 | 1.20 | 1.88 |
| Nebraska | 22 | *1.29 | *1.45 | 37 | .70 | *.77 | 116 | 1.12 | 1.27 | 10 | *1.11 | *1.12 | 24 | *1.09 | *1.10 | 209 | 1.07 | 1.73 |
| North Dakota | 7 | *.58 | *.58 | 44 | *1.69 | *1.69 | 34 | *2.00 | *2.00 | 8 | *2.00 | *2.00 | 4 | *2.00 | *2.00 | 44 | 1.42 | 1.42 |
| South Dakota | 13 | *.54 | *2.25 | 27 | *.96 | *.60 | 29 | *1.12 | *.87 | 0 | 0 | 0 | 1 | *.11 | *.33 | 49 | .78 | *1.12 |
| Region 8—Total | 768 | .77 | .88 | 2,051 | .82 | .69 | 3,241 | .89 | .86 | 617 | .66 | .92 | 465 | .51 | .48 | 12,414 | 1.09 | 1.06 |
| Arkansas | 138 | .78 | .56 | 422 | .73 | .51 | 810 | .80 | .77 | 138 | .51 | *.55 | 0 | — | — | 1,086 | 1.00 | 1.03 |
| Louisiana | 196 | .57 | *5.00 | 530 | .75 | *1.44 | 955 | .83 | .79 | 161 | .56 | — | 200 | .57 | .51 | 3,111 | 1.18 | *2.00 |
| New Mexico | 30 | .64 | *1.29 | 113 | 1.07 | *.75 | 102 | 1.03 | *1.31 | 18 | *.86 | *1.00 | 0 | — | — | 212 | 1.35 | *1.61 |
| Oklahoma | 111 | 1.48 | *1.13 | 180 | 1.00 | 1.04 | 482 | .94 | .88 | 37 | 1.19 | *1.15 | 5 | *.62 | *.80 | 1,393 | 1.09 | 1.10 |
| Texas | 293 | .83 | 1.11 | 806 | .87 | .78 | 892 | 1.00 | 1.26 | 263 | .81 | *1.50 | 260 | .47 | .47 | 6,612 | 1.06 | 1.06 |
| Region 9—Total | 57 | .86 | .89 | 89 | .80 | .87 | 162 | .69 | .75 | 24 | *.86 | *.85 | 22 | *1.16 | *1.42 | 507 | 1.19 | 1.33 |
| Colorado | 25 | *.96 | *1.05 | 34 | .68 | .68 | 70 | .65 | .69 | 14 | *.70 | *.83 | 0 | — | — | 303 | 1.36 | 1.57 |
| Idaho | 5 | *2.50 | *1.00 | 21 | *1.17 | *1.00 | 45 | .55 | .53 | 0 | 0 | 0 | 3 | *.43 | *.60 | 113 | .91 | *.52 |
| Montana | 15 | *.83 | *.92 | 14 | *.56 | *1.08 | 21 | *1.24 | *1.25 | 2 | *1.00 | *1.00 | 1 | — | — | 42 | *1.56 | *2.06 |
| Utah | 7 | *.78 | *1.00 | 7 | *.88 | *.50 | 6 | *.55 | *.43 | 2 | *1.00 | *.50 | 11 | *1.10 | *1.20 | 22 | .65 | *1.80 |
| Wyoming | 5 | *.45 | *.44 | 13 | *1.30 | *1.57 | 20 | *1.18 | *1.55 | 6 | *2.00 | *1.33 | 7 | *3.50 | *3.50 | 27 | *1.35 | *.85 |
| Region 10—Total | 295 | .79 | .87 | 711 | .94 | .77 | 2,215 | .89 | .87 | 133 | .80 | 1.07 | 17 | *1.70 | *1.50 | 5,880 | 1.00 | 1.07 |
| Arizona | 53 | .73 | *.72 | 159 | .80 | .62 | 187 | .91 | 1.31 | 16 | *.62 | *.60 | 0 | — | — | 452 | 1.18 | 1.49 |
| California | 182 | .76 | .93 | 454 | 1.00 | .84 | 1,746 | .92 | .86 | 89 | .87 | *1.40 | 9 | *1.12 | *1.00 | 4,553 | .99 | 1.12 |
| Los Angeles | 46 | .81 | *.93 | 114 | .76 | .66 | 467 | .81 | .63 | 22 | *1.22 | *2.20 | 1 | *.50 | 0 | 1,824 | 1.09 | 1.05 |
| San Francisco | 18 | .43 | *.60 | 37 | .67 | *.79 | 151 | .77 | .79 | 8 | *1.33 | *.50 | 1 | *.33 | — | 446 | .82 | 1.12 |
| Nevada | 7 | *.58 | *.38 | 2 | *.33 | 0 | 54 | .63 | .66 | 6 | *3.00 | *4.00 | 0 | — | — | 78 | 1.24 | 1.00 |
| Oregon | 18 | *1.64 | *1.25 | 25 | *1.39 | *.83 | 61 | .55 | *.67 | 4 | *4.00 | — | 0 | — | — | 173 | 1.48 | *1.73 |
| Washington | 21 | *.84 | *.54 | 33 | .89 | *1.00 | 84 | .68 | .62 | 6 | *.38 | *1.67 | 6 | — | — | 386 | 1.04 | 1.06 |
| Alaska | 13 | *2.17 | *2.17 | 22 | .59 | .59 | 14 | .39 | .39 | 2 | *.15 | *.15 | 0 | — | — | 138 | .81 | .81 |
| Hawaii | 1 | *.25 | 0 | 16 | *3.20 | *1.50 | 69 | *2.38 | *3.00 | 10 | *1.67 | *1.33 | 2 | *1.00 | 0 | 100 | .77 | .75 |
| Canal Zone | 5 | *.50 | — | 14 | *.70 | — | 44 | .81 | — | 0 | 0 | — | 0 | — | — | 134 | 1.06 | — |
| Total continental United States | 5,368 | .86 | .87 | 13,890 | .91 | .88 | 28,132 | .94 | .96 | 3,124 | .81 | 1.06 | 1,781 | .81 | .75 | 79,235 | 1.13 | 1.14 |
| Total United States including Territories | 5,523 | .86 | .88 | 14,720 | .91 | .88 | 28,994 | .94 | .96 | 3,579 | .82 | 1.04 | 1,792 | .81 | .75 | 81,437 | 1.13 | 1.13 |

• Adjusted. *Ratio calculated with a base less than 30. —Ratio not calculable, base is zero or unknown.

Source: PHS Form 688 FSA-PHS—Division of Venereal Disease, Office of Statistics 4/26/51 (ML-MC)mw.

## Cases of Syphilis and Gonorrhea Reported to the Public Health Service by State and Territorial Health Departments, October—December 1950

[Known military cases excluded]

| Federal Security Agency regions | Syphilis | | | | | | | | | | | | | | | Gonorrhea | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Primary and secondary | | | Early latent | | | Late and late latent | | | Congenital | | | Not stated | | | | | |
| | Total all sources | Ratio to prior quarter | | Total all sources | Ratio to prior quarter | | Total all sources | Ratio to prior quarter | | Total all sources | Ratio to prior quarter | | Total all sources | Ratio to prior quarter | | Total all sources | Ratio to prior quarter | |
| | | All sources | Private physician sources | | All sources | Private physician sources | | All sources | Private physician sources | | All sources | Private physician sources | | All sources | Private physician sources | | All sources | Private physician sources |
| Region 1—Total | 97 | .77 | .75 | 185 | 1.24 | 1.13 | 547 | 1.16 | 1.15 | 50 | 1.04 | .78 | 51 | 1.55 | *1.43 | 804 | .85 | .83 |
| Connecticut | 19 | *.68 | *.62 | 90 | 1.25 | .98 | 101 | 1.20 | .92 | 10 | *.77 | *.50 | 9. | *.64 | *.62 | 189 | .92 | .98 |
| Maine | 16 | *.57 | *.70 | 11 | *.65 | *.75 | 42 | 1.14 | *.82 | 9 | *4.50 | *2.50 | 0 | — | — | 56 | .65 | .59 |
| Massachusetts | 47 | 1.21 | *1.39 | 58 | 1.71 | *1.94 | 212 | 1.42 | 1.37 | 15 | *.83 | *.64 | 0 | — | — | 465 | .85 | .82 |
| New Hampshire | 3 | *.60 | *.60 | 4 | *1.00 | *.75 | 41 | 1.14 | 1.16 | 8 | *1.14 | *1.00 | 0 | 0 | 0 | 20 | *.77 | *.77 |
| Rhode Island | 3 | *.38 | *.17 | 17 | *1.06 | *1.00 | 129 | .89 | 1.18 | 6 | *1.20 | *.80 | 42 | *2.33 | *2.08 | 44 | .81 | .67 |
| Vermont | 9 | *.50 | *.50 | 5 | *.83 | *.83 | 22 | *1.05 | *1.05 | 2 | *.67 | *.67 | 0 | — | — | 30 | *1.03 | *1.03 |
| Region 2—Total | 643 | 1.06 | 1.28 | 2,302 | 1.02 | 1.12 | 7,175 | 1.08 | 1.15 | 353 | 1.14 | 1.55 | 128 | 1.02 | 1.39 | 8,250 | .86 | 1.04 |
| Delaware | 20 | *2.00 | *2.20 | 57 | 1.02 | .81 | 56 | 1.08 | *.69 | 8 | *1.60 | *.67 | 37 | *1.37 | *1.00 | 62 | .84 | *.59 |
| New Jersey | 77 | 1.01 | 1.23 | 394 | .71 | .98 | 825 | .92 | 1.13 | 68 | 1.10 | *1.58 | 0 | — | — | 1,054 | .88 | 1.06 |
| New York | 376 | 1.16 | 1.30 | 1,159 | 1,19 | 1.37 | 5,262 | 1.12 | 1.19 | 195 | 1.23 | 1.54 | 91 | .93 | *1.81 | 4,887 | .87 | 1.07 |
| New York City | 328 | 1.21 | 1.50 | 1,108 | 1.18 | 1.38 | 4,417 | 1.14 | 1.27 | 147 | 1.30 | 1.47 | 71 | .79 | *1.53 | 4,144 | .86 | 1.10 |
| Pennsylvania | 170 | .88 | *.88 | 692 | 1.03 | .72 | 1,032 | 1.04 | .93 | 82 | .96 | *2.25 | 0 | — | — | [a] 2,247 | .81 | .79 |
| Philadelphia | 88 | .79 | 0 | [a] 487 | 1.18 | .83 | [a] 512 | 1.04 | 1.20 | 28 | .80 | *2.00 | 0 | — | — | 1,912 | .85 | .79 |
| Pittsburgh | [a] 15 | *.83 | *.20 | [a] 51 | .84 | *.91 | 163 | .97 | .82 | 8 | *.62 | *1.00 | 0 | — | — | 157 | .59 | — |
| Region 3—Total [b] | 833 | .96 | 1.06 | 2,668 | 1.14 | 1.03 | 2,935 | 1.01 | 1.06 | 679 | 1.01 | .82 | 80 | .84 | .85 | 12,923 | .85 | .89 |
| District of Columbia | 17 | .47 | 0 | 218 | .95 | *1.67 | 549 | 1.00 | *1.18 | 16 | *1.33 | 0 | 0 | 0 | — | 3,087 | .81 | *1.40 |
| Maryland | 116 | 1.13 | *2.00 | 276 | 1.33 | *1.48 | 476 | .95 | 1.34 | 43 | 1.13 | *.40 | 48 | .80 | *.80 | [b] 2,098 | 1.02 | 1.21 |
| Baltimore | 70 | 1.21 | *2.40 | 202 | 1.70 | *1.57 | 331 | 1.00 | *1.52 | 26 | *1.53 | 0 | 47 | .82 | *.83 | [b] 1,833 | 1.07 | 1.42 |
| North Carolina | 232 | .86 | *1.64 | 635 | 1.16 | .87 | 315 | 1.30 | *1.17 | 76 | .93 | — | 0 | — | — | 3,136 | .83 | 1.09 |
| Virginia | 225 | .95 | .98 | 519 | 1.26 | 1.09 | 620 | 1.17 | 1.30 | 59 | 1.16 | *1.90 | 28 | *1.17 | *1.00 | 2,265 | .82 | .79 |
| West Virginia | 125 | 1.42 | .68 | 152 | .92 | .87 | 274 | .77 | .78 | 37 | .84 | *.42 | 0 | — | — | 647 | .66 | .67 |
| Puerto Rico | 114 | .86 | — | 854 | 1.13 | — | 696 | .96 | — | 448 | 1.02 | — | 4 | *.67 | — | 1,670 | .93 | — |
| Virgin Islands [b] | 4 | *1.33 | — | 14 | *.67 | 0 | 5 | *.62 | 0 | 0 | 0 | — | 0 | 0 | — | 20 | *.80 | — |
| Region 4—Total | 387 | .95 | .85 | 1,692 | 1.00 | 1.03 | 3,399 | .88 | .94 | 301 | 1.08 | .89 | 535 | 1.36 | 1.61 | 5,228 | .87 | 1.07 |
| Kentucky | 78 | .80 | 1.00 | 193 | .97 | 1.10 | 435 | 1.10 | 1.49 | 76 | 1.25 | *1.25 | 11 | *2.75 | *3.67 | 986 | .87 | 1.33 |
| Michigan | 145 | .96 | .83 | 521 | .96 | .99 | 942 | .71 | .87 | 71 | 1.11 | 1.00 | 524 | 1.34 | 1.58 | 2,257 | .96 | 1.08 |
| Ohio | 164 | 1.04 | .81 | 978 | 1.02 | 1.05 | 2,022 | .94 | .90 | 154 | 1.01 | .81 | 0 | — | — | 1,985 | .78 | 1.00 |
| Region 5—Total | 503 | .90 | .90 | 1,173 | 1.09 | .98 | 2,498 | 1.04 | 1.02 | 208 | .99 | 1.06 | 57 | .72 | .72 | 6,264 | .93 | .86 |
| Illinois | 308 | .81 | .79 | 784 | 1.12 | 1.10 | 1,552 | 1.12 | 1.18 | 110 | 1.04 | 1.04 | 0 | — | — | 5,250 | .93 | .92 |
| Chicago | 163 | .88 | .88 | 563 | 1.18 | 1.24 | 825 | 1.17 | 1.35 | 55 | 1.02 | *1.20 | 0 | — | — | 4,284 | .93 | 1.15 |
| Indiana | 136 | 1.86 | 1.84 | 307 | 1.12 | .96 | 600 | 1.03 | .95 | 72 | .86 | 1.10 | 0 | — | — | 642 | .94 | .82 |
| Minnesota | 15 | *.75 | *1.11 | 23 | *.88 | *.62 | 96 | .77 | .65 | 5 | *1.67 | *1.33 | 4 | *.80 | *.75 | 174 | .76 | .66 |
| Wisconsin | 44 | .49 | .55 | 59 | .78 | .53 | 250 | .80 | .81 | 21 | *1.17 | *.94 | 53 | .72 | .72 | 198 | .98 | .70 |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Region 6—Total | 1,197 | .80 | .99 | 3,591 | .97 | 1.21 | 5,148 | .94 | 1.32 | 1,039 | .92 | 1.62 | 400 | .86 | .84 | 16,283 | .75 | .79 |
| Alabama | 121 | .57 | .51 | 565 | .83 | 2.27 | 504 | .86 | *3.33 | 62 | .37 | *1.33 | 388 | .87 | .86 | 864 | .70 | .71 |
| Florida | 313 | 1.04 | 1.26 | 997 | 1.06 | 1.35 | 1,361 | 1.22 | 1.38 | 96 | .79 | *1.16 | 0 | — | — | 3,219 | .81 | .89 |
| Georgia | 350 | .80 | 1.02 | 524 | .83 | — | 871 | .70 | *.90 | 326 | 1.45 | — | 0 | — | — | 3,483 | .86 | 0 |
| Mississippi | 148 | .63 | .67 | 396 | .81 | .66 | 1,195 | .82 | .86 | 312 | .71 | *1.47 | 0 | — | — | 2,423 | .65 | .75 |
| South Carolina | 125 | .84 | *2.00 | 695 | 1.11 | .52 | 424 | .82 | .76 | 85 | 1.55 | *1.50 | 0 | — | — | 1,746 | .71 | .92 |
| Tennessee | 140 | .90 | .66 | 414 | 1.27 | 1.15 | 793 | 1.50 | 1.47 | 158 | 1.34 | *3.71 | 12 | *.67 | *.56 | 4,548 | .73 | .87 |
| Region 7—Total | 333 | .97 | 1.00 | 599 | .92 | .92 | 1,335 | .83 | .84 | 137 | .85 | .88 | 98 | 1.02 | .93 | 1,579 | .70 | .75 |
| Iowa | 79 | 1.16 | 1.38 | 99 | 1.14 | 1.28 | 216 | .68 | .72 | 34 | 1.13 | *1.00 | 9 | *.60 | *.53 | 175 | .68 | .59 |
| Kansas | 66 | 1.47 | 1.28 | 111 | .92 | .87 | 320 | .93 | .90 | 38 | *1.90 | *1.50 | 7 | *.64 | *.40 | 296 | .85 | .89 |
| Missouri | 156 | .83 | .88 | 318 | .95 | 1.04 | 691 | .91 | .99 | 53 | .56 | .85 | 43 | 1.05 | .94 | 905 | .67 | .92 |
| St. Louis | 53 | .70 | .79 | 151 | .88 | .98 | 284 | .81 | .96 | 20 | .42 | *1.00 | 1 | *.14 | 0 | 388 | .52 | .70 |
| Nebraska | 13 | *.59 | *.56 | 40 | 1.08 | *.75 | 75 | .65 | .50 | 5 | *.50 | *.22 | 31 | *1.29 | *1.26 | 150 | .72 | .65 |
| North Dakota | 4 | *.57 | *.57 | 8 | .18 | .18 | 15 | .44 | .44 | 1 | *.12 | *.12 | 8 | *2.00 | *2.00 | 18 | .41 | .41 |
| South Dakota | 15 | *1.15 | *.56 | 23 | *.85 | *.67 | 18 | *.62 | *1.08 | 6 | — | — | 0 | 0 | 0 | 35 | .71 | *.68 |
| Region 8—Total | 641 | .83 | .80 | 2,009 | .98 | 1.00 | 2,869 | .89 | 1.09 | 644 | 1.04 | 1.07 | 667 | 1.43 | 1.51 | 10,532 | .85 | .99 |
| Arkansas | 115 | .83 | 1.22 | 490 | 1.16 | 1.40 | 749 | .92 | 1.22 | 160 | 1.16 | *1.83 | 0 | — | — | 850 | .78 | .99 |
| Louisiana | 188 | .96 | *.20 | 570 | 1.08 | *.48 | 889 | .93 | .89 | 268 | 1.66 | — | 202 | 1.01 | .90 | 2,352 | .76 | .81 |
| New Mexico | 26 | .87 | *.33 | 97 | .86 | *1.78 | 87 | .85 | *1.18 | 25 | *1.39 | *.33 | 0 | — | — | 151 | .71 | *1.00 |
| Oklahoma | 62 | .56 | *.46 | 154 | .86 | .72 | 416 | .86 | .77 | 45 | 1.22 | *1.27 | 3 | *.60 | *.50 | 1,178 | .85 | .72 |
| Texas | 250 | .85 | .75 | 698 | .87 | .65 | 728 | .82 | 2.10 | 146 | .56 | *.33 | 462 | 1.78 | 1.78 | 6,001 | .91 | 1.01 |
| Region 9—Total | 51 | .89 | .74 | 74 | .83 | .92 | 166 | 1.02 | .86 | 16 | *.67 | *.59 | 20 | *.91 | *.65 | 481 | .95 | 1.33 |
| Colorado | 28 | *1.12 | *.95 | 32 | .94 | *1.00 | 81 | 1.16 | .93 | 8 | *.57 | *.70 | 0 | — | — | 287 | .95 | 1.19 |
| Idaho | 9 | *1.80 | *2.00 | 12 | *.57 | *.57 | 36 | .80 | *.72 | 2 | — | — | 1 | *.33 | *.33 | 67 | .59 | *1.00 |
| Montana | 10 | *.67 | *.67 | 12 | *.86 | *.92 | 12 | *.57 | *.55 | 1 | *.50 | *.50 | 8 | *8.00 | *7.00 | 65 | 1.55 | 1.94 |
| Utah | 3 | *.43 | 0 | 6 | *.86 | *4.00 | 10 | *1.67 | *2.67 | 3 | *1.50 | *1.00 | 5 | *.45 | *.33 | 24 | *1.09 | *.33 |
| Wyoming | 1 | *.20 | *.25 | 12 | *.92 | *.64 | 27 | *1.35 | *.88 | 2 | *.33 | *.25 | 6 | *.86 | *.14 | 38 | *1.41 | *1.36 |
| Region 10—Total | [b] 253 | .88 | .97 | [b] 669 | .94 | 1.07 | [b] 2,260 | 1.02 | 1.05 | [b] 124 | .93 | .61 | [b] 11 | *.65 | *1.67 | 5,840 | 1.00 | 1.02 |
| Arizona | 38 | .72 | *1.15 | 147 | .92 | 1.02 | 235 | 1.26 | .99 | 16 | *1.00 | *.50 | 0 | — | — | 360 | .80 | .94 |
| California | 177 | .97 | 1.10 | 449 | .99 | 1.25 | 1,722 | .99 | 1.07 | 93 | 1.04 | .80 | 8 | *.89 | *3.50 | 4,547 | 1.00 | 1.08 |
| Los Angeles | 47 | 1.02 | *.69 | 113 | .99 | 1.25 | 487 | 1.04 | 1.29 | 18 | *.82 | *.82 | 0 | 0 | — | 1,740 | .95 | 1.04 |
| San Francisco | 17 | *.94 | *2.00 | 43. | 1.16 | *1.00 | 142 | .94 | .96 | 8 | *1.00 | *1.00 | 1 | *1.00 | — | 403 | .90 | 1.15 |
| Nevada | 3 | *.43 | *.67 | 9 | *4.50 | — | 60 | 1.11 | 1.06 | 5 | *.83 | *.25 | 0 | — | — | 61 | .78 | .60 |
| Oregon | [b] 11 | *.61 | *.20 | [b] 18 | *.72 | *.80 | [b] 59 | .97 | *.75 | [b] 3 | *.75 | 0 | [b] 0 | — | — | 158 | .91 | .76 |
| Washington | 19 | *1.36 | *1.00 | 29 | .88 | *.36 | 139 | 1.74 | 1.84 | 1 | *.17 | *.20 | 2 | *.33 | *.50 | 420 | 1.14 | 1.04 |
| Alaska | 3 | *.23 | *.15 | 9 | *.41 | *.23 | 11 | *.79 | *.14 | 0 | 0 | 0 | 0 | — | — | 204 | 1.48 | .94 |
| Hawaii | 2 | *2.00 | — | 8 | *.50 | *.50 | 34 | .49 | .50 | 6 | *.60 | *.75 | 1 | *.50 | — | 90 | .90 | .94 |
| Canal Zone | 6 | *1.20 | — | 13 | *.93 | — | 41 | .93 | — | 1 | — | — | 0 | — | — | 123 | .92 | — |
| Total continental United States | [b] 4,815 | .90 | .97 | [b] 14,077 | 1.01 | 1.06 | [b] 27,586 | .98 | 1.06 | [b] 3,097 | .99 | 1.03 | [b] 2,042 | 1.15 | 1.18 | [b] 66,200 | .84 | .96 |
| Total United States including Territories [b] | 4,944 | .90 | .96 | 14,975 | 1.02 | 1.06 | 28,373 | .98 | 1.06 | 3,552 | .99 | 1.03 | 2,047 | 1.14 | 1.18 | 68,307 | .84 | .96 |

[a] Adjusted. [b] Provisional. *Ratio calculated with a base less than 30. —Ratio not calculable, base is zero or unknown.

Source: PHS Form 688; FSA-PHS—Division of Venereal Disease; Office of Statistics, 7/12/51 (ML-JNH)mw.

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# A Rational Approach to Yaws Control[1]

**Frank W. Reynolds, M. D., M. P. H.;[2] Thorstein Guthe, M. D., M. P. H.;[3] and Guillermo Samame, M. D., M. P. H.[4]**

The rationale for a world outlook on treponemal diseases—syphilis, bejel, yaws, and pinta—rather than an approach by clinical entities based on signs, symptoms, and syndromes, originally was pointed out by Hudson (*1*). This viewpoint has been emphasized by recent advances in the study of these diseases and it has become desirable to re-evaluate the methods by which they can be suppressed, and perhaps ultimately eliminated, in some areas as major public health problems. It is proposed herein to review briefly the most significant of these advances and, on the basis of them, to formulate certain general principles of a rational approach to yaws control, since this treponemal disease is widely prevalent in tropical and semitropical areas of the world, incapacitating rural populations, reducing work efficiency in agriculture, and retarding economic development.

### *Development of an Improved Therapeutic Agent*

The first and most important development has been the demonstration of the efficacy of penicillin in the treatment of all diseases of treponemal etiology: syphilis (*2*), yaws (*3*), bejel (*4*), and pinta (*5*). It is becoming more and more apparent that this antibiotic adds to the therapeutic armamentarium a drug of high therapeutic effectiveness (*6*) and of minimal toxicity (*7*). The availability of penicillin has revolutionized completely the therapy of the treponemal diseases. In the treatment of yaws it has been shown (*8, 9, 10, 11*) repeatedly to be an expedient and efficacious form of medication (fig. 1). As additional strings for the therapeutic bow, it now is known that aureomycin (*12, 13*) and Chloromycetin (*14*) are active against *Treponema pertenue*, a fact that dispels any fear, however remote, that the future development of penicillin resistance conceivably could interfere seriously with yaws control programs.

### *Simplification of Administration*

Patients treated with the early preparations (aqueous solutions of crude amorphous penicillin) required hospitalization because of rapid excretion following intramuscular injection. Moreover, the results of therapy with the early products left much to be desired from the standpoint of therapeutic efficacy. Subsequent improvements in the penicillin itself, by elimination of the relatively inefficacious K fraction, and the development of preparations of crystalline penicillin G with prolonged activity, have offset these disadvantages. Evidence has accumulated (*15, 16, 17*) that serum concentrations of penicillin maintained for from 4 to 6 days suffice to "cure" early infections of syphilis (and presumably the other treponematoses as well) in a high proportion of cases. The repository penicillin preparation currently in widest use against treponemal diseases (procaine penicillin G in oil with 2 percent aluminum monostearate, internationally designated as PAM) gives effective serum concentrations (*18*) of this duration in 90 percent of patients, following a single intramuscular injection. In addition, the possible combined effect of two or more antibiotics remains unexplored in the therapy of treponemal diseases. It will be appreciated readily how greatly "one shot" or "few shots" schedules of a nontoxic form of therapy simplify the administrative difficulties that formerly were a major obstacle to effective yaws control projects, when reliance was placed on repeated injections of inherently toxic arsenicals given over a period of time. In figure 2 are shown the obtainable serum concentrations of penicillin following intramuscular injections of procaine penicillin in oil with 2 percent aluminum monostearate (PAM), indicating that prolonged effective action can be achieved over several days with 0.3 to 2.4 million units of PAM.

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[1] From the United Nations, World Health Organization (WHO). Presented at the Symposium on Recent Advances in the Study of Venereal Diseases, Washington, D. C., April 24–25, 1951.

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### *Greater Understanding of the Biology of the Treponematoses*

Recent laboratory research on the fundamental nature of the treponemal diseases has demonstrated the existence of humoral treponema-immobilizing antibodies (*19*) which are distinguishable from the reagins identified by ordinary serologic tests. This discovery lends support to the concept of treponematosis so eloquently propounded by Hudson (*1*), particularly since the work of Khan (*20, 21*) reemphasizes the close immunologic relationships between the treponemes of syphilis and yaws. Additional studies of a similar nature currently are being conducted under the direction of Dr. T. B. Turner in the International Treponematosis Laboratory Center at Johns Hopkins University, Baltimore, Md., with the active cooperation of the WHO/UNICEF[5] treponemal disease control teams or consultants working in Haiti, Indonesia, Iraq, Thailand, Lebanon, Yugoslavia, and elsewhere.

## An Approach to Yaws Control

Penicillin as an improved therapeutic weapon makes possible simplification of the administrative details of yaws campaigns. With our new insight into the biology of the treponemal diseases, it is possible to delineate a more rational concept of yaws control. In this concept there is an important, but by no means dominant, role for international organizations, such as the World Health Organization (WHO), which can make available to the less advanced countries of the world (where yaws is widely prevalent) advisory and technical services, and the United Nations International Children's Emergency Fund (UNICEF), which can supplement the resources of these countries by providing essential supplies and equipment. The part these international organizations can play most effectively in assisting the health services of a nation to control yaws is shown diagrammatically in figure 3. The role of WHO and UNICEF should be additive to the efforts of national health administration, and not a substitute for effective action on the national level.

It will be seen from figure 3 that the role of international organizations during the five phases of a yaws control program is supplementary to that of the health administration concerned. The total program is represented by the outline of the figure; the parts played by the government, WHO, and UNICEF have been identified. The part played by WHO is greatest throughout phases 1, 2, and 3—the preliminary analysis of the problem, the development of plans of operations, and the survey and training phase—following which WHO support and assistance should decrease gradually. Assistance from UNICEF should commence in the second phase of the program when the plans of operation are developed, and should increase during the third and fourth phases with the training and mass treatment campaigns. This assistance should decrease rapidly during the consolidation phase. At no time does the international assistance exceed 50 percent of the total effort.

The approach to yaws control here discussed is conceived in five stages:

1. Orientation and preliminary analysis of the problem.
2. Development of methodology.
3. Demonstration, survey, and training phase.

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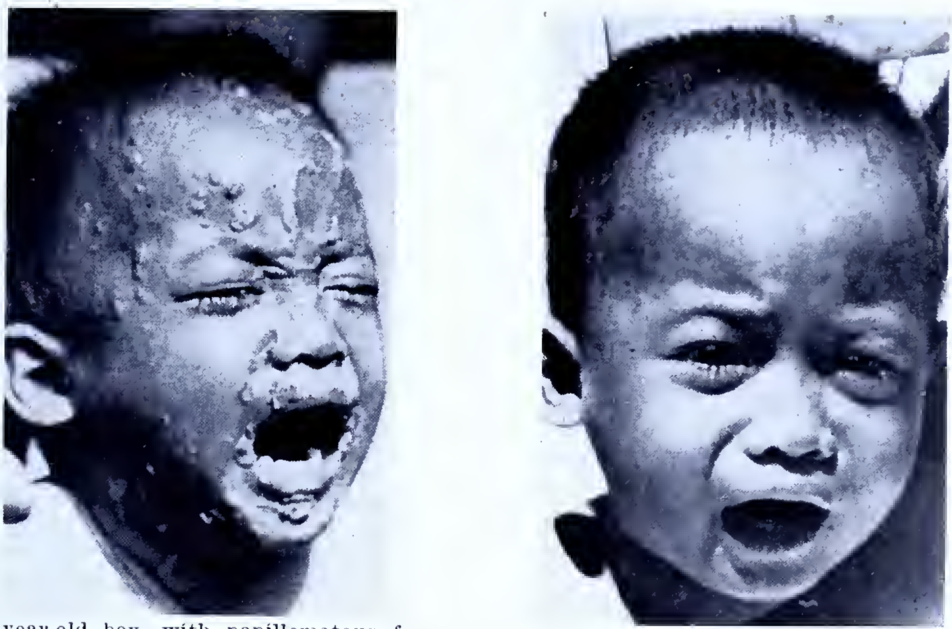
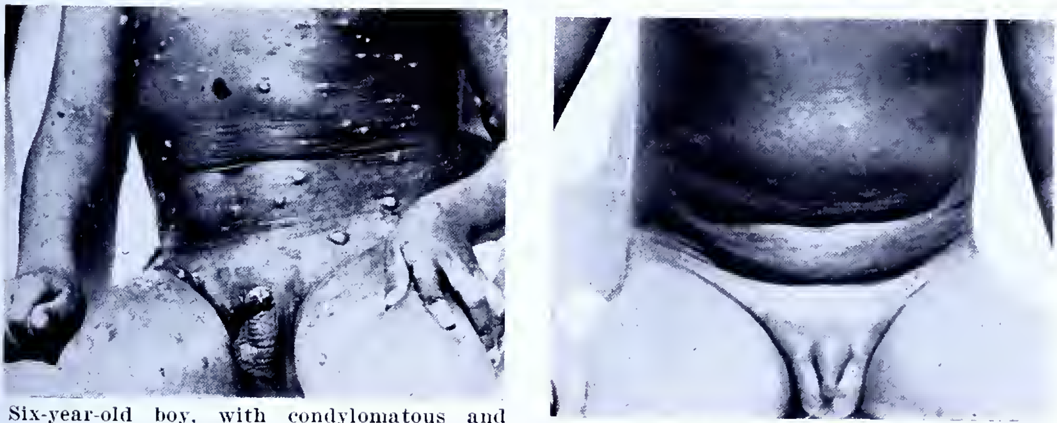
[5] World Health Organization, United Nations International Children's Emergency Fund.



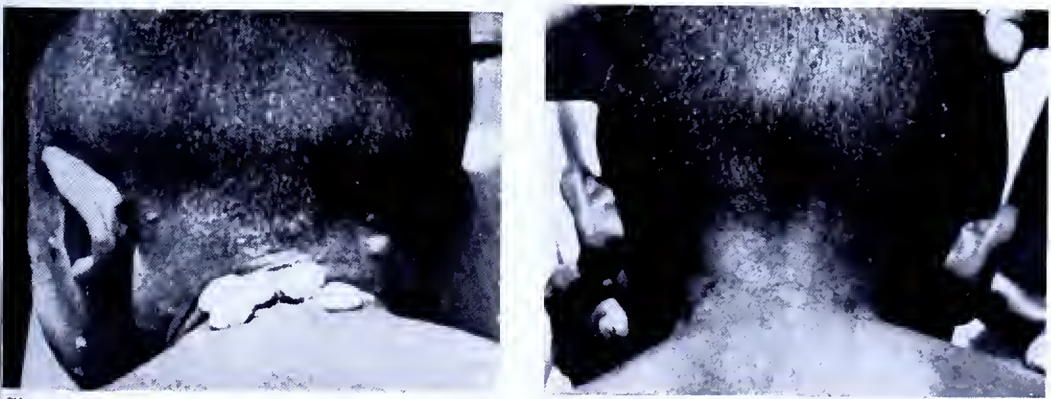
Two-year-old boy, with papillomatous framboesides on face.

One month after treatment was instituted.



Six-year-old boy, with condylomatous and papular framboesides over trunk and limbs.

Three weeks after treatment was instituted.



Six-year-old boy (same as above) showing papillomatous framboesides on neck.

Three weeks after treatment was instituted.

(Treatment consisted of two injections of 600,000 units each of penicillin G in oil with 2 percent aluminum monostearate. Injections were given 1 week apart.)

FIGURE 1.

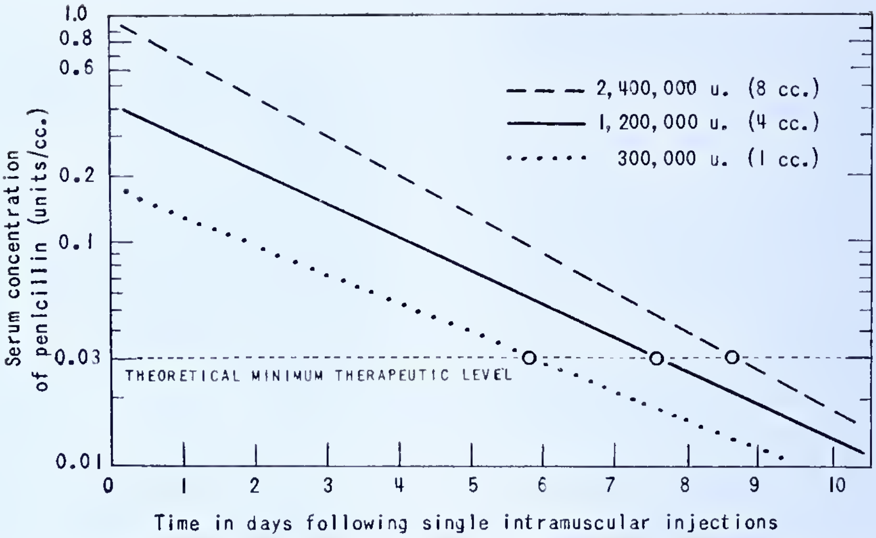


FIGURE 2.—Serum concentrations following single intramuscular injections of procaine penicillin G in oil with 2 percent aluminum monostearate (Thomas, Rein, and Kitchen, 1949).

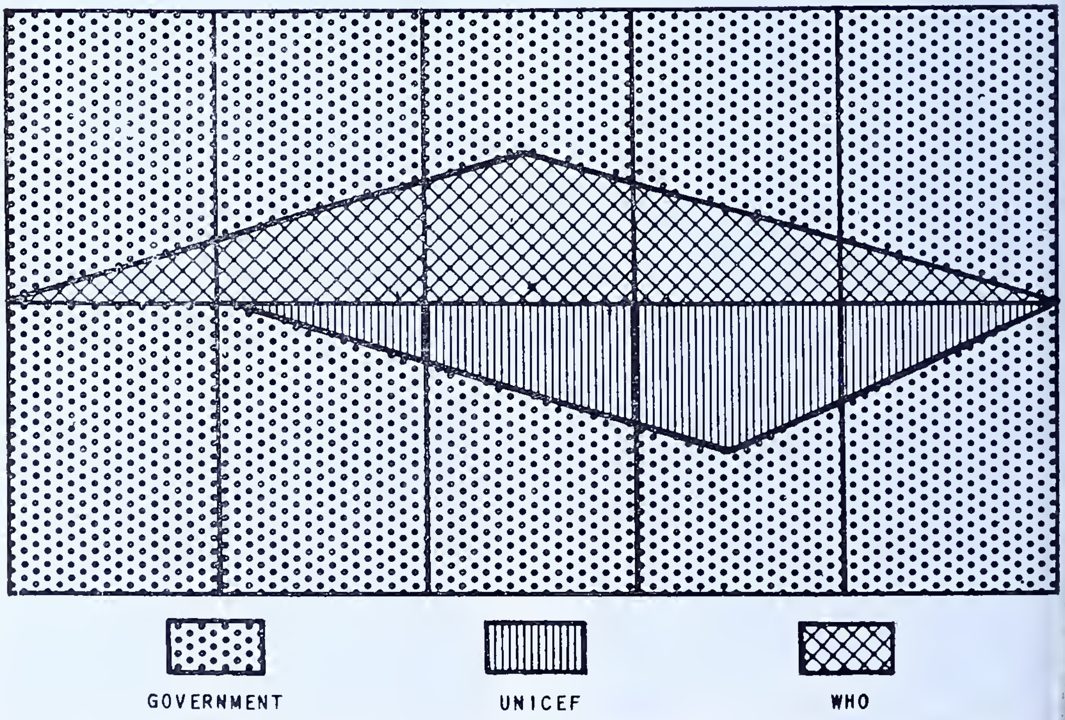


FIGURE 3.—The role of international organizations during the five phases of a yaws control program.

Phase 1. Orientation and preliminary analysis of problem.
Phase 2. Development of methodology (plans of operation).
Phase 3. Demonstration, survey, and training phase.
Phase 4. Expansion phase (the "mass treatment campaign").
Phase 5. Consolidation phase.

4. Expansion phase.
5. Consolidation phase.

### *Orientation and Preliminary Analysis of the Problem*

A problem properly stated is well along toward solution. Accordingly, prior to embarking on a program for yaws control, it is important that there be a reasonably accurate and detailed concept of the nature and extent of the problem in the area in which the disease is to be suppressed. Yaws control should be seen in relation to other health needs of the community, and never as an isolated problem. Hence, it is necessary to know what other conditions constitute major public health hazards, their relative importance, and their amenability to control measures.

Many unusual epidemiologic features characterize the treponemal diseases. The syphilis problem in the United States, for example, is overwhelmingly one of the Negro population (*22*). In the Nordic maritime nations, special aspects of syphilis control among seamen are important (*23*). Yaws is predominantly a problem among peasant children in certain rural areas of the tropics, and is particularly prevalent in communities where the population lives a primitive kind of existence. There are important climatologic aspects of its epidemiology, such as the commonly observed increase in the incidence of fresh lesions during rainy seasons (*24*). In Colombia, the highest incidence of yaws is among the inhabitants of small villages situated in the warm, damp, wooded areas near the Pacific Ocean and along the banks of rivers that drain into the ocean (*25*). Saunders, Kumm, and Rerrie (*26*) state: "Yaws has a widespread, patchy distribution in rural Jamaica. Where it is common there are practically always found a heavy rainfall, a fertile, moisture-holding soil supporting an abundant vegetation, a peasant population living under insanitary conditions, and many *H. pallipes* flies." In Uganda (*27*) there are areas in which yaws is prevalent and syphilis is rare, and other areas not far distant where syphilis predominates.

The more that is known about the local situation and the distribution of yaws throughout an area, the more readily can it be attacked in a logical and systematic manner (*28*).

### *Development of Methodology*

Having determined the extent and nature of a yaws control problem, the next step is to develop a workable plan for future operations. This begins with the assignment of responsibility, which almost invariably should rest with the health administration of the country. If international personnel are to be utilized, their positions should be advisory.

In developing a plan of operations, the administrative subdivisions of the section must be considered, but because of variations in the incidence of disease, there are certain to be modifications in the scope of the program from district to district.

In yaws control work there always are difficulties in case finding, because of the predominately rural nature of the problem and the obstacles in the way of bringing medical care to patients who frequently live in areas that are relatively inaccessible (*29*). In this connection, it is worth while mentioning the often neglected potentialities of water transport in areas that are difficult of access by the land route because of poor roads. The degree of isolation of the local population and its stability in terms of the amount of migration should receive due consideration. Climatic conditions, especially seasonal variations in temperature and rainfall, should also be considered.

During this early phase, difficulties of logistics, especially the provision of adequate supplies and equipment, must be carefully appraised. The availability of local personnel and funds, currency restrictions, transport difficulties both from overseas and within the country, and the potentialities of local manufacture of the supplies needed all must be considered, along with other factors that vary in importance from place to place. There are practical contributions that can be made by persons who have made a study of local social and anthropologic factors, that may make the difference between success or failure in the program under consideration.

### *Demonstration, Survey, and Training Phase*

During the third phase of the program it is desirable to demonstrate, first in primary areas ("control" or "research" areas), and later, on a wider scale, the efficacy of modern diagnostic and therapeutic procedures under the conditions that pertain locally. The extent of the problem should be delineated, and the local personnel, upon whom will devolve the responsibility for applying modern methods to the masses of patients, should be trained, so that they will be able to consolidate and integrate the work into the permanent public health structure of the country.

It is during this phase that the World Health Organization can be of greatest assistance. The method employed by WHO is to make available to the country a team of qualified experts to demonstrate, survey, and train, and to advise on technical matters relating to subsequent expansion and consolidation.

**Table 1.**—*Serologic outcome*[1] *in 787 patients with early yaws treated with penicillin (1 year's observation)*

| Treatment schedule (penicillin in beeswax oil) | Serologic cure | | Serologic improvement | | Serologic cure and improvement | Serologic fastness | Positive | Serologic relapse | Total patients |
|---|---|---|---|---|---|---|---|---|---|
| | Number | Percent | Number | Percent | Total percent | Number | Percent | Number | |
| 1.2 mill/units in 4 days | 115 | 36.9 | 173 | 55.4 | 92.3 | 21 | 7.7 | 3 | 312 |
| 1.2 mill/units in 2 days | 122 | 38.9 | 163 | 51.9 | 90.8 | 26 | 9.2 | 3 | 314 |
| 2.4 mill/units in 4 days | 79 | 49.0 | 73 | 45.3 | 94.3 | 8 | 5.6 | 1 | 161 |
| Total | 316 | 40.1 | 409 | 51.9 | 92 | 55 | 7 | 7 | 787 |

[1] Quantitative Kahn technic (Rein, Kitchen and Petrus, 1949).

The international team logically consists of four persons: a chief medical adviser, a serologist, a public health nurse, and a specialist in health education of the public. The chief medical adviser should be a well-qualified yaws specialist with an appreciation of sound public health administration procedures, who is able to adapt modern control technics to the local situation.

The serologist must be versed in the latest technics of serodiagnosis and should demonstrate the rule of properly performed serologic tests in the diagnosis of latent yaws and the value of quantitative procedures (*30*) in determining the results of penicillin therapy under local conditions. Table 1 shows the serologic outcome in a series of patients with early yaws, treated with penicillin, and followed with quantitative serologic technic. The clinical results after 2 years' observation in this series of patients were excellent and serologic "cure" or improvement was observed in 90.8 percent, 92.2 percent, and 94.3 percent of the cases in the three different treatment schedules employed. If the serologic observations in these same patients are regrouped on the basis of serologic "cure" alone, the impression would be gained that penicillin would be considerably less efficacious in the treatment of yaws than is the case when appropriate quantitative serologic technic is employed. The use of quantitative serologic technic is therefore necessary.

The public health nurse is concerned with problems of case finding and clinic operation; and the health program specialist, with developing the most feasible methods of approach to health education of the local populace.

Concurrently with the training activities of the team, or preferably prior to the beginning of its operations, it may be desirable that certain local personnel, destined to play important parts in the program, be sent abroad for advanced study, preferably to other operating programs. This can be accomplished through utilization of national or international fellowships.

### *Expansion Phase (The "Mass Treatment Campaign")*

Large-scale yaws control campaigns based on the use of metal chemotherapy with arsenicals and bismuth have been undertaken in many countries. Some of these, as for example those in Jamaica (*31*), the Belgian Congo (*32*), Samoa (*33*), Sierra Leone (*34*, *35*), Uganda (*36*), and Venezuela (*37*) have been described in such a way as to be technically helpful to those planning new yaws control programs. In many other programs, the problem has been incompletely surveyed, suitable control areas have not been established, and the results of treatment of large population groups cannot be properly evaluated (*38*).

Except for the brief article by Arje (*39*), there have been no reports of mass treatment campaigns against yaws based on repository penicillin preparations published thus far, but there are currently being conducted, with the aid of advisory services from WHO and penicillin and other supplies furnished by UNICEF, programs against yaws in Haiti, Indonesia, Thailand and other areas, against bejel in Iraq, and against endemic syphilis in Yugoslavia. In these programs, more than two and a half million people have been examined up to this time and some three-quarters of a million cases treated.

The work toward the elimination of endemic syphilis among the villagers in parts of rural Yugoslavia has focused world-wide attention on the success of this type of treponemal disease control by mass penicillin therapy. The results thus far support the practicability of this method of approach under favorable conditions.

It will be seen from table 2 that in a selected, isolated village in Yugoslavia having little or no migration the entire population was followed for 16 months. Seronegativity rates of 75 percent and 66 percent were obtained in early and in latent syphilis, respectively, while originally 34 percent of the population had

**Table 2.—*Serologic reactivity in entire population of Yugoslavian village of Brusnica, Bosnia, treated [1] in May 1949***

| Stage of syphilis | Percent of total population (330) positive on first examinations | Serologic reaction on reexamination | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Seronegative (percent) | | | Reduction in titer (percent) | | | No reduction in titer (percent) | | | Sero- or clinical relapse (percent) | | |
| | | 2 months post-treatment | 10 months post-treatment | 16 months post-treatment | 2 months post-treatment | 10 months post-treatment | 16 months post-treatment | 2 months post-treatment | 10 months post-treatment | 16 months post-treatment | 2 months post-treatment | 10 months post-treatment | 16 months post-treatment |
| All stages | 66 (Kahn) | 13 | 68.3 | 72.0 | 42 | 31.7 | 24.9 | 45 | 0 | [2] 3.1 | 0 | 0 | 0 |
| Early | 48.5 | | 71.5 | 75.0 | | 28.5 | 22.2 | | 0 | [3] 2.8 | | | |
| Late | | | 48.8 | 66.0 | | 51.2 | 32.1 | | 0 | [3] 1.9 | | | |

From a personal communication from Dr. E. I. Grin, Sarajevo, Yugoslavia.

[1] Treatment: ½ of infected persons—penicillin alone 600,000 units every 2 days for 6 doses (total dosage 3,600,000 units); ½—penicillin plus 10 cc. 10-percent bismuth subsalicylate.

[2] No reduction since previous examination; no new infections; no difference in penicillin alone and penicillin plus bismuth.

[3] Since previous examination at 10 months posttreatment; no difference in penicillin and penicillin plus bismuth; only 1 new infection (returned from Army); no infections or relapses.

been seronegative and 66 percent seropositive. It will further be noted that no relapse or reinfection was seen in this village where it had been possible to examine the entire population and to treat, without exception, all infected persons. Further, no difference in the outcome of treatment was observed between the two different treatment schedules employed, penicillin alone and penicillin associated with bismuth.

On the basis of several such experiences, there is every reason to believe that if intelligently planned and meticulously executed on a large scale, much can be accomplished by a mass treatment program, since a concerted effort to reduce the reservoirs of infectiousness cannot fail to exert a beneficial effect on the incidence of fresh treponemal infections. Additive effect to interrupt the infectious cycle can be given by treatment of noninfectious contacts, so as to reach also those who are incubating the disease at the time of the mass treatment campaign.

In mass treatment campaigns against yaws, the primary emphasis should be upon the elimination of infectious cases. This does not preclude the treatment of disfiguring and deforming late manifestations of the disease, nor the discovery and treatment of latent cases, which if untreated may become reactivated and serve as a focus for further spread. Nevertheless, from the public health standpoint, the latter type of case is of secondary importance during the expansion phase of the program.

There is ample evidence, however, that mass treatment alone does not suffice. The enormous difficulties in case finding, especially in rural areas, the infectious relapses that occasionally follow penicillin treatment, and the recrudescences in cases that were latent at the time of the mass treatment program, require that in addition to the initial campaign there be supplemental procedures of a more permanent nature.

The experience of Harding (*35*) is illustrative. His campaign was carried out among a population of 276,000 people in Sierra Leone, and the treatment was with Stovarsol and bismuth. After initial mass diagnosis and treatment, there was a marked reduction in infectious yaws. When this was followed by the establishment of permanent treatment facilities, the incidence continued to fall, but when this again was supplemented by case-finding home visits, no infectious cases were found in samples of 1,500 to 1,700 persons about 15 months after the initial treatment. In contrast to this, when mass treatment alone was used, the disease was found again to be increasing within 8 months after the treatment was given.

**Table 3.**—***Outcome*** [1] ***of yaws campaigns in Sierra Leone following mass therapy with and without follow-up measures (modified from Harding)***

| Treatment | 1941 | 1942 | 1943 | 1944 | 1945 | 1946 |
|---|---|---|---|---|---|---|
| | Percent | Percent | Percent | Percent | Percent | Percent |
| Mass treatment only | 13.7 | 5.8 | --------- | 7.5 | --------- | --------- |
| Mass treatment plus permanent treatment facilities. | --------- | 5.8 | --------- | 3.0 | 1.8 | --------- |
| Mass treatment, permanent facilities plus home visits. | --------- | --------- | --------- | 3.4 | 0.6 | 0 |

[1] All rates are expressed as percentage prevalence of infectious yaws among sample population groups.

The experiences of Harding have been tabulated in table 3, which points up the necessity for consolidating the gains made by mass treatment campaigns, through the establishment of treatment facilities, as well as active case finding, through home visits by ambulant attendants, sanitary inspectors, male nurses, or similar technical personnel. The consolidation phase of the program is further discussed below.

One of the eminently practical details

of a mass treatment campaign is the determination of the optimal dosage of penicillin to be used. With all schedules of penicillin administration thus far utilized on a mass basis there has been (as indeed there also have been with metal chemotherapy) a certain number of infectious relapses or reinfections. Roughly, this number has been inversely proportional to the duration of the effective penicillin serum (and tissue) concentrations, and thus inversely related to the cost per patient treated. Because penicillin remains one of the most expensive single items to be budgeted in a yaws control program, it is obvious that the decision as to penicillin dosage must be a "calculated risk"—a compromise between maximum therapeutic efficacy and administrative expediency.

This problem has been considered by the WHO Expert Committee on Venereal Infections and Treponematoses (*40*), which has expressed the following opinion:

> "There is now evidence to support the view that with penicillin, a high proportion of cures can be obtained in early infectious treponemal infections if therapeutically effective serum concentrations are maintained for a minimum of 4–6 days. 'Penicillin-free' intervals in the serum should not exceed 24 hours and the frequency of injections should be adjusted according to the immediate or delayed effect characteristics of the penicillin preparation used.
>
> "Procaine penicillin G in oil gelled with 2 percent aluminum monostearate, microcrystalline 5 microns (internationally designated as PAM), is now the preparation of choice and it should be used in the treatment of early infectious treponemal infections with due regard to the above facts. . . .
>
> "For mass campaigns, it is recognized that penicillin must be conserved insofar as is compatible with effective public health results. There is, however, a limit below which the total dosage of penicillin is not compatible with effective results in a sufficiently high percentage of cases.
>
> "As a compromise between maximum efficacy and practical expediency, it is suggested that field teams consider 1.2 million units of PAM to be the *minimum dosage* for the treatment of early infectious lesions in adults. . . .
>
> "It is further suggested to field teams engaged in mass campaigns that they administer on the day the diagnosis is established the full *minimal total dose* indicated above. Following this, whenever feasible from the standpoint of field operations, a further injection may be given 3–5 days later . . ."

### *Consolidation Phase*

From the above discussion of what can and what cannot be accomplished in a mass treatment campaign, it is patently clear that provision must be made for permanent treatment facilities and for a permanent staff of well-trained national personnel to consolidate the gains made in the earlier stages of the program (*41, 42, 43*).

The question of how a yaws control program developed with the assistance of international agencies can be integrated most effectively into the permanent public health structure of a given country is one to which there is no single answer. It is essential that the work should not overshadow or compromise other important public health activities. Yet, permanent treatment facilities must be maintained, active case-finding work suitable to the local situation must continue, and the workers trained during the earlier phases of the program must continue the work against yaws. If these things are not done within a comparatively brief period of time, the incidence of the disease will be again on the increase, and the time, effort, and financial resources that have been expended will have been largely wasted.

Lambert's work (*33*) in Western Samoa emphasizes this point. As a result of an intensive campaign in that country during the years 1923 to 1926, in which 25,000 persons out of a population of 40,000 received treatment with arsenicals and bismuth, infectious yaws was practically eradicated from the island. However, because of political disturbances, the campaign then ceased, and within 4 years, cases of early yaws "began to sprout like mushrooms in every direction."

In addition to the obvious danger in applying inadequate treatment schedules, another potential danger lies in the premature relenting in the pressure that should continue to be applied if treponemal diseases are to be effectively eliminated. This is the possibility of an increase in venereal syphilis following the effective suppression of yaws (*28, 43*). Because of the reciprocal relative immunity that exists between the two diseases (*44, 45*), it is important to bear in mind that, at least until one generation of yaws-free children has reached sexual maturity, it will not be possible to discount this very real possibility.

## Summary and Conclusions

1. In recent years there have been advances in the study of diseases of treponemal etiology (syphilis, bejel, yaws, pinta), that make desirable a revaluation of the methods by which these diseases can be controlled. The most significant of these advances include: (*a*) the advent of penicillin therapy; (*b*) the development of repository penicillin preparations which greatly simplify administration difficulties; and (*c*) greater understanding of the nature of the treponematoses. In this paper the implications of these developments in the control of yaws are being discussed.

2. Because of these advances, the outlook for yaws control has become brighter. It is believed that a rational approach to the control of this disease should be developed in five phases: (1) Orientation and preliminary analysis of the problem; (2) development of methodology; (3) demonstration, survey, and training phase; (4) expansion phase; and (5) consolidation phase.

3. In the formulation and execution of yaws control programs, there is an important role for international organizations. The function of these organizations should be to stimulate and add to the efforts of national health administrations, and not to provide a substitute for effective action on the national level.

4. There is a reasonable prospect that, if yaws control programs are carefully planned and meticulously carried out, this disease ultimately can be eliminated as a major public health problem.

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# Development of Treponemal Immobilizing Antibodies in Mice Following Injection of Killed *Treponema Pallidum* (Nichols Strain)[1]

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Attempts to study the mechanisms of immunity in syphilis by means of artificial immunization of rabbits have been unsuccessful (*1, 2, 3*). Although it has been shown that rabbits injected with killed *Treponema pallidum* developed reagin, these animals were not resistant to reinfection (*2, 3*), and their serums possessed no agglutinating, complement-fixing, or protective antibodies against specific treponemal suspensions (*3*).

In the present study of immunity in syphilis, the experimental animal employed was the white mouse. The literature on mouse syphilis has been reviewed recently by Gueft and Rosahn (*4*). The mouse, unlike the rabbit, develops merely an asymptomatic infection after inoculation with virulent spirochetes, and the few and inconclusive immunity studies in this species have been concerned with resistance to reinoculation after infection.

As will be shown, the injection of sufficient numbers of living or suitably killed *T. pallidum* into mice will result in circulating treponemal immobilizing antibodies which may be demonstrated in vitro by the method of Nelson and Mayer (*5*). The production of similar antibodies in rabbits by the injection of killed antigens will be described in a later communication. The results of challenge infection in such animals will be described also in a separate paper.

## Methods

Male CF-1 strain mice (Carworth Farms) of similar weight from the same shipment were used in each experiment. The animals were caged in groups of 5 to 10 in an air-conditioned room at a temperature of 70° F. Purina dog chow and water were given ad libitum.

Spirochetes were obtained from the testicles of rabbits with early syphilitic orchitis 7 to 14 days after intratesticular inoculation with the Nichols strain of *T. pallidum*. Testicles in which the reaction had reached its height were not used. The tissues were weighed, minced with scissors, ground in a mortar, and extracted with a total volume of diluent which was equivalent in cubic centimeters to twice the weight of the tissue in grams. In the first experiment, with living organisms, the testicles were extracted with 25-percent serum saline. In all other experiments, saline alone was used for extraction. The spirochete suspensions were centrifuged for 5 minutes at a low rate of speed, and the supernatant strained through eight layers of sterile gauze.

Each suspension was carefully calibrated (*6*), and the doses for all mice were inoculated intraperitoneally in a volume of 1 cc.

As a control on the presence of syphilitic infection in mice inoculated with living organisms, tissue from mice infected 3 months previously was transferred to rabbits. A pooled suspension of brain, spleen, liver, axillary nodes, and thymus gland from each mouse was inoculated intradermally into three sites on the backs of three different rabbits. Lesions which developed in these rabbits demonstrated that the mice had been infected. As a control on the noninfectivity of killed spirochetes, 1 cc. of the

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treated suspension under study was inoculated into each testicle of two rabbits. After the animals were observed for 4 months, during which no orchitis developed, node transfers were made. Both inguinal and both popliteal nodes from each rabbit were emulsified in 25-percent serum saline, and the suspension then inoculated into one testicle each of two normal rabbits. No lesions developed in the node transfer animals during a 4-month observation period.

To obtain serum for treponemal immobilization studies, mice were killed by exsanguination from the heart. The serum was stored at —20° C. until assayed. Except for the substitution of bovine plasma fraction V for crystalline albumin in Nelson's medium, the immobilization tests were set up in essentially the same manner as previously used in this laboratory (7). In quantitative tests twofold dilutions of serum were made in saline. Where sufficient data were obtained, serum titers were expressed as the dilution which immobilized 50 percent of the spirochetes. Wide fluctuations in the sensitivity of individual immobilization tests have been noted (7, 8). Methods used to minimize the effects of these variations when comparing titers of large groups of serums are explained in the text.

## Results

### *Antigenicity of Living Spirochetes*

In a preliminary study it was found that serum from normal mice of the CF-1 strain possessed no immobilizing activity. Serum was obtained from 14 mice which had been in the laboratory for 9 months, and from 12 mice in the shipment used in the present study. Immobilization tests on the serum from all animals were negative, thus providing the negative control group. Before immunizing mice with killed organisms, an investigation was made of the antigenicity of living *T. pallidum* for this species.

Syphilitic infection was produced in 18- to 20-gm. mice by the intraperitoneal inoculation of each mouse with 8 million spirochetes. This inoculum represented at least eight times the infectious dose for the CF-1 strain (*9*). The infected mice were then divided into two groups. One group received no further inoculations. The second group received three additional injections, 2 weeks apart, to a total dose of 16 million spirochetes during a period of 6 weeks. Seven weeks after the single inoculation of the first group and 1 week after the last inoculation of the second group, mice from both groups were bled.

Treponemal immobilization tests were run first on the undiluted mouse serum. The positive serums were then retested quantitatively if a sufficient amount of the sample remained. This was done in two different assays, in each of which five or more of the negative serums were rerun. In each of the three tests, the titer of the pooled positive control serum was the same; therefore, the three assays were considered to be of comparable sensitivity. A composite record of the results of these examinations is shown in table 1. A single dose of 8 million living, virulent spirochetes failed to provide the production of immobilizing antibodies during a period of 7 weeks. Serums from 9 of the 11 mice inoculated with this dose were negative, and serums from 2 mice

**Table 1.—*Results of treponemal immobilization tests on serum from mice inoculated with living spirochetes***

| Mice inoculated with a single dose of 8 million organisms. Bled 7 weeks later | | Mice inoculated with 16 million organisms in 6 weeks. Bled 1 week later | |
|---|---|---|---|
| Mouse No. | Titer | Mouse No. | Titer |
| 1 | Negative | 1 | >1:40 |
| 3 | do | 2 | Doubtful |
| 4 | do | 3 | >1:160 |
| 5 | do | 4 | >1:10 |
| 6 | do | 5 | >1:10 |
| 7 | Doubtful | 6 | >1:320 |
| 8 | Negative | 7 | 1:80 |
| 9 | Doubtful | 8 | 1:160 |
| 10 | Negative | 9 | >1:10 |
| 11 | do | 10 | >1:160 |
| 12 | do | 11 | >1:160 |
| | | 12 | >1:160 |
| | | 13 | 1:80 |

Positive control 36, 1:800.

were doubtful in reaction. In the mice inoculated with a total dose of 16 million spirochetes, 12 of 13 serums were positive and 1 sample was doubtful. Although the serums from most of the positive mice were not diluted sufficiently high to obtain end points, the titers ranged from greater than 1 : 10 to greater than 1 : 320.

Mice from the group which received a single dose of 8 million organisms were bled again 3 months after inoculation. Serums from 12 of 14 mice were negative for immobilizing activity, and samples from 2 mice were positive. Dilutions of the two positive serums were negative. Syphilitic infection was proved in these same mice by the transfer of tissue from 12 of the mice to rabbits. Transfers from 11 of the 12 mice produced lesions in rabbits in 21 to 28 days. The transfer from 1 mouse failed to produce lesions.

### *Antigenicity of Killed Spirochetes*

In studying the antigenicity of killed spirochetes, relatively small immunizing doses were given the mice. Small doses were used in an effort to avoid the possibility of reaching the peak of antibody titer with large amounts of partially destroyed antigen. Thus, the effect of the method of killing upon the antigenicity of the organism was more accurately evaluated. The minimum inoculum of living spirochetes which produced immobilizing antibodies was between 8 and 16 million organisms. Therefore, total doses of killed spirochetes were employed which were approximately halfway between these two limits.

Initially, a comparison was made of the antigenicity of living and killed spirochetes from the same testicular suspension. Four groups of 25-gm. mice were inoculated with a total dose of 12 million spirochetes per mouse, given in two injections, 2 days apart. One group of mice received living organisms; a second group received spirochetes which had been heated for 40 minutes at 56° C.; a third group was given spirochetes which had been heated for 40 minutes at 70° C.; and a fourth group received spirochete suspension which had been exposed for 75 minutes at room temperature to an equal volume of 1 : 250 Mapharsen in saline. (The living and heat-killed suspensions had been similarly diluted to twice their original volume with saline alone.) The mice receiving living organisms were inoculated immediately after the testicular suspension was prepared. The suspensions heated at 56° C. or Mapharsen-treated were inoculated into control rabbits before the mice were injected. Animals from each of the four groups were bled 10 days after the last immunizing injection.

Although it is well known that different assays for immobilizing activity may vary widely in sensitivity (*7, 8*), it was not technically feasible to examine the four groups of serums at the same time under the same experimental conditions. Therefore, the samples were tested in three different experiments, comparing only two groups of serum in a single experiment, and in each experiment using the same pool of complement, and the same positive control serum as a reference standard of sensitivity. In experiment 1, serum samples from mice inoculated with living spirochetes were tested with samples from mice receiving Mapharsen-killed organisms. In experiment 2, the latter samples were then tested again with specimens from mice immunized with spirochetes heated at 56° C. In experiment 3, the antigenicity of spirochetes heated at 56° C. was compared with that of spirochetes heated at 70° C.

The results of the experiments are presented in table 2, in which serum titers are expressed as the dilution which immobilized 50 percent of the spirochetes. Statistical analysis of the findings shows there was no difference in the antigenicity of living and Mapharsen-killed spirochetes, but that antigenicity was significantly reduced by heating the organisms for 40 minutes at 56° C. It is obvious that antigenicity was almost destroyed by heating the spirochetes for 40 minutes at 70° C.

The 50-percent end points and their estimated variances were calculated by Kärber's method (*10*). In experiment 1,

**Table 2.—*Comparison of antigenicity of living, Mapharsen-killed, and heat-killed spirochetes for mice***

[Serum titers expressed as 50-percent end points]

EXPERIMENT 1

| Living spirochetes | | Mapharsen-killed spirochetes | |
|---|---|---|---|
| Mouse No. | Titer | Mouse No. | Titer |
| 3 | 1:190 | 3 | 1:192 |
| 4 | 1:233 | 4 | 1:370 |
| 5 | 1:290 | 5 | 1:302 |
| 6 | 1:275 | 6 | 1:236 |
| 7 | 1:195 | 7 | 1:114 |
| 8 | 1:135 | 8 | 1:311 |
| 9 | 1:197 | 9 | 1: 84 |
| 10 | 1:186 | 10 | 1:260 |
| 11 | 1:273 | 11 | 1:239 |
| 12 | 1:182 | 12 | 1:233 |
| Weighted geometric mean. | 1:208 | Weighted geometric mean. | 1:216 |
| 95-percent confidence limits. | 67–148 percent | 95-percent confidence limits. | 66–151 percent |

Positive control 36, 1:298.

EXPERIMENT 2

| Spirochetes heated 40 minutes at 56° C. | | Mapharsen-killed spirochetes | |
|---|---|---|---|
| Mouse No. | Titer | Mouse No. | Titer |
| 4 | 1:553 | 3 | 1:352 |
| 5 | 1:255 | 4 | 1:630 |
| 6 | 1:288 | 5 | 1:492 |
| 7 | 1:192 | 6 | 1:212 |
| 8 | 1:311 | 7 | 1:427 |
| 9 | 1:174 | 8 | 1:353 |
| 10 | 1:270 | 9 | 1:383 |
| 11 | 1:522 | 10 | 1:253 |
| 12 | 1:512 | 11 | 1:267 |
| 13 | 1:226 | 12 | 1:553 |
| Weighted geometric mean. | 1:305 | Weighted geometric mean. | 1:359 |
| 95-percent confidence limits. | 66–151 percent | 95-percent confidence limits. | 67–148 percent |

Positive control 36, 1:763.

EXPERIMENT 3

| Spirochetes heated 40 minutes at 56° C. | | Spirochetes heated 40 minutes at 70° C. | |
|---|---|---|---|
| Mouse No. | Titer | Mouse No. | Titer |
| 4 | 1:161 | 4 | Negative. |
| 5 | 1:102 | 5 | Do. |
| 6 | 1:67 | 6 | Do. |
| 7 | 1:42 | 7 | Do. |
| 8 | 1:233 | 8 | 1:21. |
| 9 | 1:57 | 9 | Negative. |
| 10 | 1:38 | 10 | Do. |
| 11 | 1:110 | 11 | Do. |
| 12 | 1:173 | 12 | Do. |
| 13 | 1:43 | 13 | 1:11. |
| Weighted geometric mean. | 1:78 | | |
| 95-percent confidence limits. | 66–151 percent | | |

Positive control 36, 1:415.

the weighted geometric mean of the 50-percent end points of serum from mice receiving living spirochetes was a dilution value of 1:208, whereas on serum from mice immunized with Mapharsen-killed spirochetes, the corresponding value was 1:216. This difference between the two values was not significant. Similarly, in experiment 2 the average 50-percent end point on serum from mice inoculated with spirochetes heated at 56° C. had a dilution value of 1:305. For serum from mice inoculated with Mapharsen-killed spirochetes, the value this time was 1:359. Although this difference in antigenicity was relatively greater than that in experiment 1, it was not significant as judged by the comparison in experiment 2 alone.

A difference in the antigenicity of Mapharsen-killed spirochetes and spirochetes heated at 56° C. can be shown, however, by considering the data from all three experiments. Data from experiment 1 provide additional information about Mapharsen-killed spirochetes, and experiment 3 contains supplemental data for organisms killed by heat at 56° C. Combining this information with that from experiment 2 and adjusting by covariance for differences in the 50-percent dilution values of the separate positive controls, it was found that the 50-percent dilution value for Mapharsen-killed spirochetes was 1:304 and for heat-killed only 1:145. This difference was highly significant at the 1-percent level, and the comparison was made at a point where the positive control 50-percent dilution value would be 1:525. Thus, there is evidence that Mapharsen-killed spirochetes were more antigenic than the heat-killed organisms.

In a second study with killed spirochetes, the effect of prolonged heating at 56° C. was investigated. Aliquot samples of the same spirochete suspension were heated for 40, 60, or 80 minutes at this temperature, and a group of mice was inoculated with suspension which was heated for each time period. The individual dose for each mouse was a single inoculation of 13 million spirochetes. Fourteen days after inoculation, mice from each of the three groups were bled. Quantitative examination of the serums showed that immobilizing activity developed after a single dose of 13 million heat-killed spirochetes, and that no perceptible decline in antigenicity occurred as a result of increasing the heating time from 40 to 80 minutes.

### Discussion

The choice of the mouse as the experimental animal in the present study was motivated by several considerations. First, the mouse, unlike man and the rabbit, develops no tissue reaction to infection with *T. pallidum* and the mechanism of this resistance has remained obscure. Second, the small size of the mouse permits the use of a larger number of organisms per unit weight of the experimental host, and thus affords an economy of both time and material for many types of study. Finally, the consistently negative results of attempts to produce artificial immunity in rabbits, together with the possibility that the immune behavior of this animal may be anomalous, made the study of another species desirable.

The results of the experiments show that the mouse provides a useful tool for the study of mechanisms of immunity in syphilis. Although an explanation was not found for the resistance of the mouse to symptomatic infection, this could not be attributed to the presence of naturally occurring immobilizing antibodies. There was, however, suggestive evidence that mouse tissues are unfavorable for the multiplication of *T. pallidum.* Mice failed to produce immobilizing antibodies during a period of 3 months after inoculation with a single infectious dose of 8 million living organisms, yet did develop antibodies after the inoculation of 12 to 16 million spirochetes. These results suggest that there may be little or no increase in the number of organisms in vivo, and that the development of antibodies was not a function of time but depended upon the number of spirochetes originally injected.

Immobilizing antibodies were produced readily in mice by the inoculation of killed organisms. The antigenic material in the spirochetes was unaffected by exposure to Mapharsen. It was relatively heat stable at 56° C., but was destroyed by heating at 70° C. The question naturally arises as to the nature of this antigen, whether it represents only one of several possible antigenic components of the cell, and whether it is different from the component which activates the protective mechanism of the host. The answers to these questions, and an explanation of the role of immobilizing antibody in immunity must await the results of further investigation.

The ability to produce antibodies against *T. pallidum* in animals without the presence of concurrent syphilitic infection provides a new tool for the study of the antigenic structure of this organism It is conceivable that subjecting spirochetes to different methods of treatment might result in various alterations in antigenic structure, and so lead to the stimulation of a new type of immunologic response in immunized animals. It is possible that this might be accomplished by the destruction of some portion of the cell, or by unmasking the antigenicity of another component. The mouse provides a convenient method for measuring changes in antigenic structure.

### Summary

In a study of the development of immobilizing antibodies against the Nichols strain of *T. pallidum* in CF-1 mice, the following results were obtained:

1. Normal mouse serum was negative for immobilizing activity.

2. Mice inoculated with 8 million living organisms failed to produce antibodies during a period of 3 months.

3. Mice inoculated with the above dose, then further inoculated to a total dose of 16 million living organisms, were positive for immobilizing antibodies.

4. Mice inoculated with 12 million living, Mapharsen-killed, or heat-killed spirochetes developed immobilizing antibodies in less than 2 weeks.

5. The antigenicity of spirochetes was not reduced when killed by exposure to 1:250 Mapharsen for 1 hour and 15 minutes.

6. Antigenicity was significantly reduced by heating the spirochetes at 56° C. for 40 minutes, and was almost destroyed by heating at 70° C. for 40 minutes.

7. Antigenicity was not perceptibly reduced by prolonging the heating time at 56° C. from 40 to 80 minutes.

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# A Study of Immunity in Experimental Syphilis as Demonstrated by Contact Exposure Challenge[1]

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In this study of immunity in experimental syphilis the method of challenge employed was contact exposure of the genital mucous membrane to suspensions of virulent *Treponema pallidum*. This procedure simulates as closely as possible in the rabbit the most common manner of exposure which occurs in man. It is a means of reinfection in which the host is favored by the natural biologic and mechanical defense mechanisms of the intact body surfaces as well as by the factors concerned in specific acquired immunity. By the contact method of challenge, it was demonstrated that a state of complete resistance arises in early syphilis during the active stage of the disease and persists for periods of 6 to 20 months after termination of the original infection. Within the time limits of the study, the duration of immunity after early syphilis, as demonstrated by contact challenge, was comparable with that following latent syphilis, when challenge was made by inoculation.

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## Methods

Normal male rabbits of mixed breeds were infected by inoculating 0.25 cc. of spirochete suspension (Nichols strain) into both testicles or scrotums. The suspensions were prepared by mincing the testicles of rabbits with early syphilitic orchitis in 10-percent serum broth, and contained 5 organisms per oil-immersion field, or approximately 10 million spirochetes per cubic centimeter. The rabbits so inoculated developed characteristic darkfield-positive syphilitic lesions. At varying intervals of time after inoculation the infections were terminated by treatment with crystalline penicillin G in aqueous solution, using a schedule previously shown to be 100-percent curative (*1*). The total dose for each animal was 14,400 units per kilogram of body weight, administered every 2 hours for 4 days in 48 equal doses.

The rabbits were challenged with the homologous strain of *T. pallidum* at periods of time which varied from 10 days to 2 years after termination of the original infection. The methods of challenge employed were contact exposure or parenteral inoculation. When challenged by inoculation, each rabbit was injected with approximately 3 million spirochetes in one scrotum. When challenged by contact, the genital mucous membrane was exposed to a similar number of organisms during a period of 1 hour. When each group of rabbits was challenged, 5 normal control rabbits were infected in a manner identical with that used for challenge.

The contact method of infection has been described in detail by Mahoney and Bryant (*2*). Modifications of the technic introduced by Arnold and Mahoney (*3*), which resulted in 100-percent infection in normal animals with the subsequent development of typical syphilitic lesions in every instance, were used in the present study. Testicular suspensions of spirochetes were prepared as described above. The rabbits were restrained on suitable boards and the genital mucosal surfaces were cleansed with saline. A small pledget of cotton (2 by 9 mm.) was soaked in the spirochete suspension and inserted into the preputial sac of each animal. The cotton was maintained in position by clamping the surrounding fur with hemostatic forceps. A measured drop (0.1 cc.) of the suspension was added to the cotton at intervals of 20 minutes during the exposure, which continued for a period of 1 hour. It was estimated that approximately 3 million spirochetes were in contact with the genital mucous surfaces during this time.

The rabbits were examined twice weekly for a period of 4 months after challenge, and the specificity of lesions which developed was proved by darkfield studies. At the end of this time, lymph node transfers were made from animals which failed to develop lesions. Bilateral, or unilateral, inguinal and popliteal nodes were removed from each test rabbit and were implanted in the scrotum of a single normal rabbit. The transfer animals were observed for a period of 4 months.

## Results

An investigation was made in a first series of experiments of the immunity which could be demonstrated in early or latent syphilis by means of contact exposure challenge. Groups of rabbits were challenged at intervals of 10 days or 6 months after adequate penicillin therapy, and five normal control rabbits were infected with each group of challenged animals. The results of these studies are summarized in table 1.

In experiment 1, 22 rabbits with early syphilis of 7 to 11 weeks' duration and with active darkfield-positive lesions at the time of treatment were challenged 10 days after completion of therapy. None of the 22 rabbits developed lesions as a result of challenge. Two rabbits developed asymptomatic reinfections, as shown by positive gland transfers, while 20 rabbits (91 percent) were immune.

In experiment 2, 15 rabbits with early syphilis of 6 to 10 weeks' duration and with active darkfield-positive lesions were treated. They were then challenged 6 months after therapy. One of the ani-

**Table 1.**—*Immunity in experimental syphilis as demonstrated by contact exposure challenge*

| Experiment No. | Duration of original infection | Time of challenge after therapy | Total number of rabbits challenged | Results of challenge [1] | | |
|---|---|---|---|---|---|---|
| | | | | Chancre developed | Node transfer positive | Node transfer negative |
| 1 | 7–11 weeks | 10 days | 22 | 0 | 2 | 20 |
| 2 | 6–10 weeks | 6 months | 15 | 1 | 3 | 11 |
| 3 | 5–8 months | 6 months | 13 | 1 | 0 | 12 |

[1] The 5 normal control rabbits on each of the 3 experiments developed a chancre.

**Table 2.**—*Duration of immunity in early syphilis: Two challenges by contact exposure to 3 million spirochetes*

| Duration of original infection | Number of rabbits challenged | Time of challenges | Results of challenges [1] | | | |
|---|---|---|---|---|---|---|
| | | | Chancre developed | Transfer positive | Transfer negative | Transfer died |
| 8–11 weeks | 20 | 1. 8 months after termination of original infection. | 0 | 0 | 18 | 2 |
| | | 2. 20 months after termination of original infection. | 2 | 3 | 13 | 2 |

[1] The 5 normal control rabbits at both first and second challenges each developed a chancre.

mals developed a chancre; 3 rabbits developed asymptomatic reinfection as shown by positive gland transfer; and 11 rabbits (73 percent) were immune.

In the third experiment, 13 rabbits with latent syphilis of 5 to 8 months' duration when treated were challenged 6 months after therapy. One of the 13 rabbits developed a chancre; none developed asymptomatic reinfection; and 12 rabbits (92 percent) were immune.

A comparison was made in a second series of experiments of the duration of immunity after early and latent syphilis. The persistence of immunity in rabbits with early syphilis was tested with two different challenges by contact exposure after the original immunizing infection was cured with penicillin. The duration of immunity in latent syphilis was similarly tested by two different challenges by reinoculation.

In the study of early syphilis, 20 rabbits with active infections of 8 to 11 weeks' duration were treated with penicillin. Eight months after completion of therapy, the rabbits were challenged by contact exposure of the genital mucous membrane to approximately 3 million spirochetes. After an observation period of 4 months for the development of lesions, the left inguinal and popliteal nodes were removed from each rabbit and implanted in the scrotum of a single normal rabbit. The challenged rabbits were then further observed for a period of 5 months, and re-treated. Three months after treatment the animals were again challenged by a similar contact exposure. This second challenge was made 1 year after the first challenge, and 20 months after termination of the original infection. After a 4-month observation period, second gland transfers were made, using the right inguinal and popliteal nodes from each challenged rabbit.

The results of the two challenges by contact exposure are shown in table 2. Each of the 5 control rabbits on both challenges developed a chancre. None of the 20 rabbits developed lesions as a result of the first challenge 8 months after treatment. Eighteen of the 20 rabbits were completely immune as shown by negative node transfers. The transfer animals from the remaining 2 rabbits died before the end of the 4-month observation period.

As a result of the second challenge 20 months after termination of the original infection, 2 of the 20 rabbits developed lesions; 3 developed asymptomatic reinfections as shown by positive gland transfer; and 13 rabbits were immune. The node transfer animals from 2 of the challenged rabbits died before the end of the observation period.

Among the original 20 rabbits with early syphilis, there were 16 from which the node transfer animal after each challenge survived the observation period. The results in this group show the combined effect of the two challenges:

| | |
|---|---|
| Immune to both challenges | 11 |
| Immune to first challenge, but infected by second challenge | 5 |

In the study of latent syphilis, 14 rabbits which had been infected 12 months previously were treated with penicillin. One year later, the animals were challenged by inoculation of approximately 3 million spirochetes into the left scrotum. After an observation period of 4 months for the development of lesions, the left inguinal and popliteal nodes were removed from each rabbit and implanted in the scrotum of a single normal rabbit. The challenged rabbits were further observed for a period of 1 month, and retreated. Seven months after re-treatment, the rabbits were again challenged by a similar inoculation in the right scrotum. The second challenge was made 1 year after the first challenge, and 2 years after termination of the original infection. After a 4-month observation period, gland transfers were made again from each challenged rabbit, using the right inguinal and popliteal nodes.

**Table 3.**—***Duration of immunity in latent syphilis: Two challenges by inoculation with 3 million spirochetes***

| Duration of original infection | Number of rabbits challenged | Time of challenges | Results of challenges [1] | | | |
|---|---|---|---|---|---|---|
| | | | Chancre developed | Transfer positive | Transfer negative | Transfer died |
| 12 months | 14 | 1. 1 year after termination of original infection. | 0 | 6 | 8 | 0 |
| | | 2. 2 years after termination of original infection. | 0 | 2 | 9 | 3 |

[1] The 5 normal control rabbits at both first and second challenges each developed a chancre.

The results of the two challenges by inoculation are shown in table 3. Each of the 5 control rabbits on both challenges developed a chancre. None of the 14 rabbits developed lesions as a result of the first challenge 1 year after treatment. Six rabbits developed asymptomatic reinfection as shown by positive gland transfers, and 8 rabbits were immune.

After the second challenge, made 2 years after termination of the original infection, none of the 14 rabbits developed lesions. Two rabbits developed asymptomatic reinfections as shown by positive gland transfer, and 9 rabbits were immune. Three node transfer animals failed to survive the observation period.

Of the 14 rabbits challenged, there were 11 animals from which node transfer rabbits after both reinoculations survived the observation period. The results in this group show the combined effect of the two challenges:

| | |
|---|---|
| Immune to both challenges | 5 |
| Infected by first challenge, but immune to second challenge | 4 |
| Infected by both challenges | 2 |

## Discussion

Infection of rabbits with syphilis through the apparently intact genital mucous membrane is a more natural procedure than infection by parenteral inoculation, and is a close approximation to the mode of transmission of this disease which is operative in human beings. In the present study, rabbits with early active syphilis, challenged by contact exposure, were resistant to much larger doses of spirochetes than animals hitherto challenged by inoculation (*1, 4*). Specific acquired immunity plus the natural defense mechanisms of the unbroken genital mucosal surfaces enabled them to withstand an exposure to approximately 3 million organisms during a period of 1 hour.

The duration of immunity after early syphilis compared favorably with that following latent syphilis, within the time limits of the study, and when the extent rather than the degree of immunity was measured. This was demonstrated in rabbits with early syphilis challenged by contact exposure to spirochetes, and in rabbits with latent syphilis challenged with similar numbers of organisms given by inoculation.

## Summary

1. Twenty of 22 rabbits with early active syphilis were immune when challenged by contact exposure 10 days after completion of therapy.

2. Eleven of 15 rabbits with early active syphilis were immune when challenged by contact exposure 6 months after treatment.

3. Eighteen of 20 rabbits with early active syphilis were immune when challenged by contact exposure 8 months after treatment.

4. Twelve of 13 rabbits with latent syphilis were immune when challenged by contact exposure 6 months after treatment.

5. In a group of rabbits with early active syphilis which were challenged by contact exposure at 8 and 20 months after termination of the original infection, 11 of 16 rabbits were immune to both challenges. Five rabbits were immune to the first challenge, but were infected by the second challenge.

6. In a group of rabbits with latent syphilis which were challenged by reinoculation at 1 and 2 years after termination of the original infection, 5 of 11 rabbits were immune to both challenges. Four rabbits were infected by the first challenge, but were immune to the second challenge. Two rabbits were infected by both challenges.

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# Cerebrospinal Fluid—A Comparative Study of Specimens Taken From the Cisterna Magna and Lumbar Subarachnoid Space

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In recent years little has been published regarding comparative values of cerebrospinal fluid constituents in specimens taken from different loci in the same individuals. This study was undertaken in an effort to ascertain the relationships, if any, between the values obtained for cell counts, total protein, Kolmer complement-fixation and colloidal mastic estimations in fluid taken from the cisterna magna and that from the lumbar sac. One hundred and twenty-eight adults admitted to the United States Public Health Service Medical Center were subjected to simultaneous cisternal and lumbar punctures in accordance with the established indications for cerebrospinal fluid examination at this institution. No other process of selection was employed, and the specimens were collected in a routine manner over a period of several days.

The patients included in this study ranged in age from 14 to 61 years. Approximately 95 percent of those examined were Negro, and 60 percent of the group were female. Preliminary review of results revealed no significant difference in values for components of fluids taken from white and Negro patients, and from male and female patients. In view of this, the reports are analyzed as a single group.

The majority of the specimens studied were, by usual criteria, normal. However, in view of the stated intent to compare fluids from the two loci, no division into normal and abnormal will be attempted. In none of these patients was there clinical or laboratory evidence of interference with the free flow of cerebrospinal fluid between the two sites.

Ayer and Solomon (*1*) reported a similar study in 1925. They concluded that the normal cisternal to lumbar total protein ratio approximates 25:30. In central nervous system syphilis the fluids were found to be essentially identical with perhaps slightly greater values for cells and total protein in the lumbar fluid. Saunders and Spiegel (*2*), studying fluids from these loci in 43 cases of late syphilis, noted that globulin values were essentially the same, as were results obtained from colloidal gold and Wassermann tests.

More recently Merritt and Fremont-Smith (*3*) in their text cite no definite relationship between total protein values in cisternal and lumbar fluids, but give only normal ranges in each instance. According to these investigators, the lumbar fluid shows the greatest degree of abnormality, and ventricular fluid, the least, in patients with neurosyphilis. Abnormalities in the cisternal fluid are said to be parallel to those in the lumbar fluid.

Dattner et al. (*4*) have found that although the values for cell counts as well as those for total protein estimations are somewhat higher in fluids obtained by spinal tap than in those secured by cisternal puncture, the difference is so insignificant it may be neglected.

The methods used by this laboratory in the examination of specimens are similar to those used elsewhere. Kolmer and colloidal mastic tests are performed in the usual manner. Cell counts are done with the use of the Fuchs-Rosenthal counting chamber. This enables the examiner to count the cells contained in 3 cubic millimeters of fluid, and greater accuracy is thereby attained. Total protein estimations are made by use of the sulfosalicylic acid turbidimetric method as outlined in the technic manual supplied with the Klett-Summerson photoelectric comparator.

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Of the 128 pairs of specimens obtained, 26 were excluded from this study because of gross or microscopic contamination with whole blood in one or both specimens. The following comparisons, then, are based upon examination of the remaining 102 pairs of specimens.

### Cell Count

Cell counts were performed on all specimens within 2 hours after the fluid was obtained.

In 21 instances counts were slightly higher in cisternal than in lumbar specimens. The reverse was true in 26 instances, and in only five additional pairs of specimens were the discrepancies great enough to lead to a difference in interpretation of the fluids from the two sites (table 1). When this did occur the count was invariably higher in the lumbar specimen. In four of five instances in which the cell counts of fluids taken from both sites exceeded 100/3 cubic millimeters the count was appreciably greater in the lumbar specimen, indicating, perhaps, the effect of gravity and stagnation. In the remaining 45 pairs of specimens, cell counts were identical.

### Complement-Fixation Test

The Kolmer complement-fixation test was positive in specimens taken from 9 of the 102 patients. In 8 instances the readings were comparable within the limits of permissible laboratory error in the lumbar and cisternal specimens (table 2). In one case the cisternal fluid was completely negative and a 4+ reaction was noted in the first tube of the

**Table 1.**—*Cell counts of cisternal and lumbar specimens from 102 unselected individuals (in terms of cells per 3 cubic millimeters)*

| Patient No. | Cell Count | | Patient No. | Cell Count | | Patient No. | Cell Count | |
|---|---|---|---|---|---|---|---|---|
| | Cisternal | Lumbar | | Cisternal | Lumbar | | Cisternal | Lumbar |
| 1 | 240 | 252 | 35 | 150 | 230 | 69 | 0 | 0 |
| 2 | 2 | 3 | 36 | 0 | 0 | 70 | 0 | 2 |
| 3 | 1 | 0 | 37 | 1 | 4 | 71 | 0 | 1 |
| 4 | 1 | 4 | 38 | 1 | 0 | 72 | 3 | 3 |
| 5 | 1 | 2 | 39 | 112 | 264 | 73 | 1 | 0 |
| 6 | 0 | 0 | 40 | 0 | 0 | 74 | 3 | 1 |
| 7 | 0 | 0 | 41 | 0 | 0 | 75 | 200 | 172 |
| 8 | 0 | 0 | 42 | 0 | 4 | 76 | 23 | 30 |
| 9 | 1 | 2 | 43 | 0 | 0 | 77 | 0 | 0 |
| 10 | 2 | 0 | 44 | 0 | 0 | 78 | 14 | 31 |
| 11 | 0 | 1 | 45 | 0 | 0 | 79 | 1 | 0 |
| 12 | 0 | 0 | 46 | 0 | 0 | 80 | 4 | 10 |
| 13 | 3 | 6 | 47 | 1 | 2 | 81 | 1 | 0 |
| 14 | 0 | 0 | 48 | 0 | 2 | 82 | 0 | 0 |
| 15 | 2 | 0 | 49 | 0 | 2 | 83 | 1 | 2 |
| 16 | 3 | 0 | 50 | 0 | 0 | 84 | 0 | 0 |
| 17 | 1 | 0 | 51 | 1 | 0 | 85 | 0 | 0 |
| 18 | 7 | 3 | 52 | 7 | 8 | 86 | 0 | 0 |
| 19 | 1 | 4 | 53 | 0 | 0 | 87 | 2 | 11 |
| 20 | 0 | 0 | 54 | 2 | 1 | 88 | 0 | 0 |
| 21 | 0 | 0 | 55 | 3 | 1 | 89 | 5 | 11 |
| 22 | 0 | 0 | 56 | 0 | 2 | 90 | 112 | 154 |
| 23 | 0 | 0 | 57 | 0 | 0 | 91 | 3 | 0 |
| 24 | 0 | 0 | 58 | 0 | 0 | 92 | 0 | 0 |
| 25 | 0 | 0 | 59 | 3 | 7 | 93 | 2 | 7 |
| 26 | 0 | 0 | 60 | 0 | 0 | 94 | 3 | 8 |
| 27 | 0 | 2 | 61 | 7 | 16 | 95 | 3 | 0 |
| 28 | 2 | 1 | 62 | 0 | 0 | 96 | 0 | 0 |
| 29 | 2 | 4 | 63 | 0 | 0 | 97 | 1 | 0 |
| 30 | 0 | 0 | 64 | 2 | 0 | 98 | 0 | 11 |
| 31 | 1 | 0 | 65 | 1 | 3 | 99 | 4 | 2 |
| 32 | 0 | 0 | 66 | 0 | 0 | 100 | 1 | 1 |
| 33 | 3 | 1 | 67 | 1 | 1 | 101 | 0 | 1 |
| 34 | 2 | 0 | 68 | 0 | 1 | 102 | 0 | 0 |

Table 2.—*Results of Kolmer complement-fixation test on 9 individuals with positive reactions*

| Patient No. | Test results | |
|---|---|---|
| | Cisternal fluid | Lumbar fluid |
| 1 | 4 4 0 0 0 | 4 4 ± 0 0 |
| 35 | 4 4 4 0 0 | 4 4 4 0 0 |
| 36 | 4 2 0 0 0 | 4 3 0 0 0 |
| 39 | 4 4 4 4 0 | 4 4 4 2 0 |
| 50 | 0 0 0 0 0 | 4 ± 0 0 0 |
| 52 | 4 2 0 0 0 | 4 1 0 0 0 |
| 75 | 4 4 4 4 2 | 4 4 4 4 3 |
| 76 | 4 4 4 4 3 | 4 4 4 4 4 0 |
| 90 | 4 3 1 0 0 | 4 4 2 0 0 |

test performed on the lumbar fluid. In no instance was reagin demonstrated in a cisternal specimen in the absence of reactivity in the lumbar fluid.

### Total Protein Test

Total protein estimations for each of the pairs of specimens are tabulated and plotted graphically (table 3 and fig. 1). The majority of cisternal fluids examined contained less than 26 mg. percent of protein and, similarly, relatively few lumbar specimens exceeded a value of 35 mg. percent. It is evident from observing table 3 and figure 1 that there is a fair relationship between the total protein values of fluids taken from the two sites, particularly when these values fall below the limits mentioned above. Relatively few specimens fell in the upper ranges, so it is difficult to ascertain if this relationship is consistent when total protein values are appreciably elevated. Below the 26-mg.-percent and 35-mg.-percent levels for cisternal and lumbar specimens, respectively, the cisternal protein values average 63 percent of the lumbar values. Among 96 pairs of specimens examined (95 percent of the total) the ratios of cisternal to lumbar total protein values ranged from 1.38 : 3 to 2.88 : 3. This is a wide range of variation, and normal as

Table 3.—*Total protein values of cisternal and lumbar specimens from 102 unselected individuals*

| Patient No. | Total protein (mg. percent) | | Patient No. | Total protein (mg. percent) | | Patient No. | Total protein (mg. percent) | |
|---|---|---|---|---|---|---|---|---|
| | Cisternal | Lumbar | | Cisternal | Lumbar | | Cisternal | Lumbar |
| 1 | 18.2 | 22.7 | 35 | 25.9 | 38.4 | 69 | 17.0 | 29.4 |
| 2 | 12.4 | 17.5 | 36 | 19.5 | 34.3 | 70 | 7.7 | 12.2 |
| 3 | 19.8 | 35.8 | 37 | 19.8 | 27.5 | 71 | 9.6 | 20.5 |
| 4 | 18.5 | 29.1 | 38 | 23.0 | 31.3 | 72 | 12.8 | 24.6 |
| 5 | 26.0 | 29.4 | 39 | 41.6 | 70.4 | 73 | 14.7 | 24.9 |
| 6 | 15.4 | 47.1 | 40 | 38.4 | 58.8 | 74 | 18.9 | 32.3 |
| 7 | 21.6 | 22.4 | 41 | 20.7 | 30.0 | 75 | 21.8 | 24.6 |
| 8 | 11.5 | 15.1 | 42 | 16.0 | 18.5 | 76 | 49.0 | 59.5 |
| 9 | 22.8 | 32.4 | 43 | 16.6 | 33.2 | 77 | 17.3 | 30.1 |
| 10 | 16.0 | 21.1 | 44 | 13.4 | 16.9 | 78 | 25.0 | 31.0 |
| 11 | 15.4 | 15.4 | 45 | 17.5 | 22.7 | 79 | 12.8 | 17.9 |
| 12 | 11.5 | 21.7 | 46 | 17.5 | 28.8 | 80 | 16.0 | 25.6 |
| 13 | 16.9 | 40.9 | 47 | 30.7 | 51.2 | 81 | 32.4 | 41.3 |
| 14 | 20.7 | 35.5 | 48 | 27.8 | 41.6 | 82 | 11.5 | 16.0 |
| 15 | 21.1 | 34.6 | 49 | 17.2 | 23.6 | 83 | 14.7 | 23.7 |
| 16 | 9.9 | 14.3 | 50 | 17.5 | 28.1 | 84 | 12.4 | 20.4 |
| 17 | 16.0 | 19.6 | 51 | 16.0 | 26.2 | 85 | 13.4 | 19.8 |
| 18 | 14.8 | 28.8 | 52 | 24.9 | 29.4 | 86 | 17.5 | 44.8 |
| 19 | 13.4 | 19.8 | 53 | 19.2 | 28.8 | 87 | 19.8 | 29.4 |
| 20 | 11.8 | 14.0 | 54 | 15.1 | 32.3 | 88 | 16.3 | 30.0 |
| 21 | 11.5 | 20.4 | 55 | 9.6 | 12.4 | 89 | 11.8 | 26.8 |
| 22 | 18.8 | 34.5 | 56 | 33.2 | 59.5 | 90 | 15.3 | 24.9 |
| 23 | 13.7 | 18.5 | 57 | 11.3 | 24.3 | 91 | 14.0 | 19.8 |
| 24 | 9.9 | 13.7 | 58 | 21.7 | 35.2 | 92 | 12.4 | 19.8 |
| 25 | 8.9 | 16.6 | 59 | 7.6 | 9.9 | 93 | 24.3 | 35.2 |
| 26 | 17.5 | 35.8 | 60 | 11.8 | 25.0 | 94 | 19.8 | 32.0 |
| 27 | 17.5 | 21.4 | 61 | 17.6 | 27.5 | 95 | 15.6 | 27.5 |
| 28 | 16.9 | 25.6 | 62 | 11.2 | 15.4 | 96 | 17.2 | 32.0 |
| 29 | 12.8 | 10.8 | 63 | 16.3 | 25.6 | 97 | 10.2 | 13.7 |
| 30 | 12.8 | 21.4 | 64 | 14.4 | 20.2 | 98 | 18.8 | 33.5 |
| 31 | 10.8 | 34.2 | 65 | 21.1 | 39.7 | 99 | 19.8 | 42.2 |
| 32 | 24.9 | 32.9 | 66 | 19.2 | 32.0 | 100 | 14.7 | 23.6 |
| 33 | 19.8 | 27.1 | 67 | 29.4 | 43.5 | 101 | 10.5 | 18.8 |
| 34 | 14.0 | 23.9 | 68 | 11.8 | 18.9 | 102 | 15.6 | 19.8 |

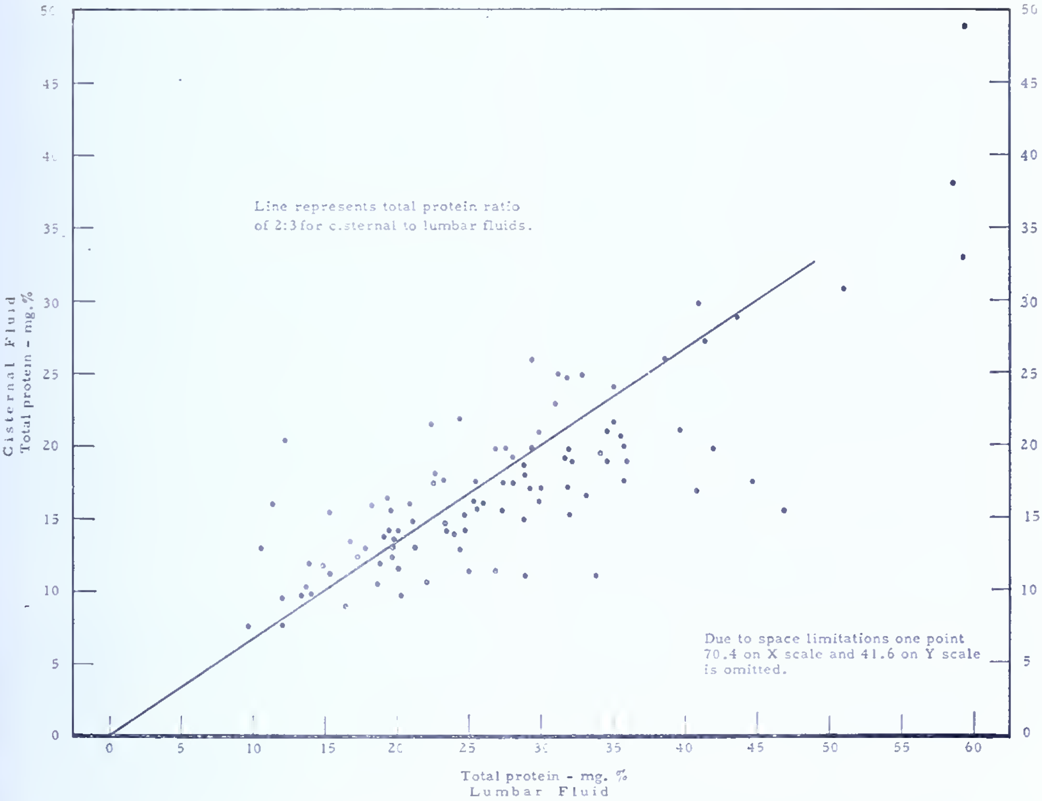

FIGURE 1.—Total protein values of 102 pairs of cerebrospinal fluid specimens.

well as abnormal fluids are included; so no well-defined conclusion can be drawn. Under the conditions of this study, however, it appears that in the absence of spinal subarachnoid block the cisternal to lumbar total protein ratio approximates 2:3 in the majority of instances.

### Colloidal Mastic Test

Positive colloidal mastic reactions were noted on specimens taken from 24 of the 102 individuals reported (table 4). In 13 instances positivity was noted only in the lumbar fluid. Readings in this group ranged from 1 in the first tube to 2, 2, 1, 1 in the first four tubes, respectively. No cisternal fluids were positive in the absence of positivity in the lumbar specimen. In the remaining 11 pairs of specimens, each of which produced a positive reaction, there was a consistent tendency for the lumbar fluid to demonstrate slightly greater reactivity than the cisternal fluid.

These findings are consistent with the previously noted greater concentration of protein in the lumbar subarachnoid space than in the cisterna magna.

Table 4.—*Results of colloidal mastic test on 24 individuals with positive reactions*

| Patient No. | Test results | |
|---|---|---|
| | Cisternal fluid | Lumbar fluid |
| 1 | 2 1 0 0 0 | 2 1 1 0 0 |
| 6 | 0 0 0 0 0 | 1 0 0 0 0 |
| 29 | 0 0 0 0 0 | 1 0 0 0 0 |
| 35 | 3 2 1 0 0 | 4 3 2 1 0 |
| 36 | 0 0 0 0 0 | 1 0 0 0 0 |
| 39 | 5 5 4 3 2 | 5 5 5 4 3 |
| 40 | 0 0 0 0 0 | 1 0 0 0 0 |
| 50 | 0 0 0 0 0 | 2 1 0 0 0 |
| 52 | 2 1 0 0 0 | 2 1 0 0 0 |
| 57 | 0 0 0 0 0 | 1 0 0 0 0 |
| 65 | 0 0 0 0 0 | 1 0 0 0 0 |
| 67 | 0 0 0 0 0 | 1 1 0 0 0 |
| 72 | 0 0 0 0 0 | 1 0 0 0 0 |
| 74 | 0 0 0 0 0 | 1 0 0 0 0 |
| 75 | 2 1 1 0 0 | 2 2 1 0 0 |
| 76 | 5 5 5 5 4 | 5 5 5 5 4 |
| 77 | 0 0 0 0 0 | 1 0 0 0 0 |
| 78 | 1 0 0 0 0 | 1 1 0 0 0 |
| 80 | 0 0 0 0 0 | 1 0 0 0 0 |
| 81 | 1 0 0 0 0 | 1 0 0 0 0 |
| 84 | 1 0 0 0 0 | 2 0 0 0 0 |
| 90 | 1 0 0 0 0 | 3 2 2 1 1 |
| 94 | 1 0 0 0 0 | 2 2 1 1 0 |
| 98 | 0 0 0 0 0 | 2 2 1 1 0 |

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### Discussion

The results of this study do not conflict with the reports of previous investigators with the exception, perhaps, of Dattner and his group. In contradiction to their statement, it appears that the difference between total protein values of cisternal and lumbar fluids is significant. It is felt that the results of this study, combined with those of previous studies, will aid in attempts to predict what changes may be expected in fluid taken from one site when that from another site is examined.

### Summary and Conclusion

1. Simultaneous cisternal and lumbar punctures were performed on 102 unselected adults admitted to the United States Public Health Service Medical Center in order that certain components of cerebrospinal fluid taken from these sites might be compared.

2. Comparison of cell counts revealed little discrepancy between the two sites with the exception that in cases of marked pleocytosis the lumbar fluid may be expected to contain appreciably greater numbers of cells than the cisternal fluid.

3. The amount of reagin present, as detected by the Kolmer complement-fixation test, is insignificantly greater in the lumbar than in the cisternal fluid.

4. Comparison of total protein values of fluids from these two sites reveals variation from case to case. However, in specimens in which appreciable elevation of values is absent a cisternal to lumbar total protein ratio of 2 : 3 is well approximated in the majority of instances.

5. Lumbar specimens produce more consistent reactivity than cisternal fluids when the colloidal mastic test is applied. This finding is consistent with the fact that total protein values are higher in lumbar than cisternal fluids in given individuals.

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# CURRENT LITERATURE

A. M. A. ARCH. DERMAT. & SYPH., CHICAGO

Antibiotics in early syphilis and in syphilis complicated by pregnancy. Harry M. Robinson and Harry M. Robinson, Jr. A. M. A. Arch. Dermat. & Syph., 63 : 687–701, June 1951.

This study, made at the University of Maryland School of Medicine, included 127 patients treated with 10 different schedules of penicillin, 14 patients treated with chloramphenicol, 20 with aureomycin, and 5 with terramycin. Results are presented in detail. Two pregnant women with early syphilis treated with chloramphenicol were delivered of nonsyphilitic infants.

Plasma proteins in various diseases of the skin. Electrophoretic studies. Walter F. Lever, Ethel Schultz, and Nancy A. Hurley. A. M. A. Arch. Dermat. & Syph., 63 : 702–728, June 1951.

The electrophoretic patterns obtained in cutaneous diseases are of no diagnostic value, but they reflect the reaction of the patient to his disease. A review of the literature is given for observations of syphilis, pinta, and yaws; however, the authors made no observations on these diseases. Observations were made on one patient who had an active inguinal bubo. This patient showed slight elevation of the total protein, a decrease in albumin. slight increases in alpha-1 and alpha-2 globulins, and a considerable increase in gamma globulin, to 18.8 percent.

## A. M. A. ARCH. PATH., CHICAGO

Syphilitic aneurysm of the left coronary artery. Sam Wesley Denham. A. M. A. Arch. Path., 51 : 661–665, June 1951.

A detailed case report is presented of a localized syphilitic aneurysm of the descending branch of the left coronary artery in an 81-year-old Negro man who died of myocardial infarction following complete thrombosis of the aneurysm. A review of the literature indicates that aneurysm of a coronary artery is rare.

## ACTA DERMAT.-VENEREOL., STOCKHOLM

Experience with cultivation of gonococci as a diagnostic method. Alice Reyn. Acta dermat.-venereol., 31 : 34–41, No. 1, 1951.

The technic employed in the collection of specimens is of great importance. Specimens from a socially poor milieu give many contaminated cultures. Other things to be considered in the cultivation are method of transportation, composition of the medium, and the influence of phagocytes.

Penicillin treatment of gonorrhea at Oslo public health stations. H. Chr. Gjessing. Acta dermat.-venereol., 31 : 249–256, No. 3, 1951.

Venereal disease control program of the Oslo Bureau of Public Health is reviewed. Methods of treatment for men and women, treatment of gonorrhea with penicillin tablets, reinfection, double infection with gonorrhea and syphilis, and masking of syphilis are discussed. Table showing incidence of gonorrhea and syphilis from 1939 to 1948 is presented.

Specificity of skin tests in lymphogranuloma venereum and chancroid. Flemming Reymann. Acta dermat.-venereol., 31 : 257–261, No. 3, 1951.

Author presents a summary of investigations which he conducted on the Frei and Ito-Reenstierna tests at the State Serum Institute in Copenhagen. In the Frei test, 23 prostitutes and 32 other patients, admitted to the Rudolph Bergh's Hospital, were examined. Results showed the test to be extremely specific. Five of the male patients had had chancroid previously; none of them showed positive Frei tests. In the Ito-Reenstierna test, 101 patients with venereal diseases were studied. Results showed that in Denmark, where chancroid is said not to occur, only very few (2 to 3 percent) of the positive reactions could not be explained by present or former symptoms of chancroid.

Complement-fixation with Lygranum antigen. Alice Reyn. Acta dermat.-venereol., 31 : 262–266, No. 3, 1951.

After a brief review of the literature, author presents a report on her preliminary investigations in which 318 serums were tested. From the results, she concludes that a single complement-fixation reaction with Lygranum antigen is not a sufficient basis for a purely serologic diagnosis of lymphogranuloma venereum, clinical conditions and anamnesis should be taken into consideration, and repeated tests should be made in order to observe a possible increase in titer.

## AM. J. HYG., BALTIMORE

Immunological relationships among species and strains of virulent treponemes as determined with the treponemal immobilization test. Abdus Saleem Khan, Robert A. Nelson, Jr., and Thomas B. Turner. Am. J. Hyg., 53 : 296–316, May 1951.

The study was concerned with quantitative measurements of treponemal immobilizing antibody in the serum of rabbits experimentally infected with *Treponema pallidum*, *Treponema pertenue*, and *Treponema cuniculi*. Serums from rabbits infected with three strains of *T. pertenue* and two strains of *T. cuniculi* for immobilizing reactivity against the Nichols strain of *T. pallidum* demonstrated a significant cross-reactivity between the three groups of treponemes. A survey of serums from rabbits infected with four strains of *T. pallidum* demonstrated a similar cross-reaction between all of those and the Nichols strain of *T. pallidum.*

## AM. J. SYPH., GONOR. & VEN. DIS., ST. LOUIS

Studies on the treponemes of bejel. I. History, morphologic characteristics, and staining properties. Emile Rizk, G. Garabedian, H. Chaglassian, and A. Pipkin. Am. J. Syph., Gonor. & Ven. Dis., 35 : 201–206, May 1951.

As viewed by darkfield illumination, the morphology and motility of organisms obtained from bejel patients in northern Syria seemed to be identical with those of *Treponema pallidum.* Organisms also behaved to different stains in the same way as *T. pallidum.* In the early stage, mucocutaneous and periosteal lesions appeared, and, after a period of latency of varying length, lesions appeared in the form of mucocutaneous relapses or gummas of the skin, nasal and long bones. Patients always exhibited positive Kahn and Kolmer reactions at one or another time.

Studies on the treponemes of bejel. II. Transmission to rabbits and observations on the course of the experimental infection. Emile Rizk, Edmond Shwayri, and Garabed Garabedian. Am. J. Syph., Gonor. & Ven. Dis., 35 : 207–215, May 1951.

Material for animal inoculation was taken from a papule on the mucosa of the lower lip of a 10-year-old boy with a clinical diagnosis of bejel. Results showed that rabbits are susceptible to infection by treponemes of bejel. The strain was propagated over six successive passages. Of 32 rabbits inoculated intratesticularly, 30 developed nodules in the inoculated organs, of which 25 were positive for treponemes. Of this group 31 rabbits developed positive Kahn and Kolmer reactions. The clinical course and serologic reaction produced in the rabbits followed the same general pattern as in infection with other treponemes.

Studies on the life cycle of spirochetes. VII. The life cycle of the Kazan nonpathogenic *Treponema pallidum* in culture. Edward D. DeLamater, Merle Haanes, and Richter H. Wiggall. Am. J. Syph., Gonor. & Ven. Dis., 35 : 216–224, May 1951.

Observations made by means of phase contrast microscopy of living cultures of the Kazan strain are presented. Organisms were maintained in Brewer's thioglycollate medium to which 10 cc. of ascitic fluid were added. Evidence for the occurrence of a complex vegetative reproductive cycle involving the production of buds which eventuate into unispirochetal cysts, in addition to the appearance of transverse division as a means of vegetative reproduction, is presented. The occurrence of multispirochetal cysts having origin both from within a single spirochete and following aggregation of two or more spirochetes is recorded.

Reports of the North Carolina syphilis studies. V. Indices in the measurement of congenital syphilis. John J. Wright, Cecil G. Sheps, and Alice E. Gifford. Am. J. Syph., Gonor. & Ven. Dis., 35 : 225–233, May 1951.

The inability to measure accurately the trend of congenital syphilis is attributed to a lack of a suitable index which will permit valid comparisons between areas or periods of time. Four main methods of measuring the incidence as found in the literature are discussed. The new proposed index associates cases discovered in children born to groups of mothers in a given period of time, with age and race being the most important factors used for purposes of grouping.

Chloromycetin (chloramphenicol) in the treatment of various types of syphilis. A preliminary follow-up. M. J. Romansky, S. Olansky, S. R. Taggart, G. S. Landman, and E. D. Robin. Am. J. Syph., Gonor. & Ven. Dis., 35 : 234–239, May 1951.

Report is a clinical and serologic evaluation of 103 patients treated with varying dosages of Chloromycetin determined on basis of milligrams per kilogram of body weight. Chloromycetin appears to be an effective oral antisyphilis agent. A dosage of 60 mg. per kilogram of body weight per day for 6 to 8 days appears to give the most favorable results of various schedules followed, except in neurosyphilis for which treatment should be given for 15 days.

The total dosage factor in the use of crystalline penicillin G. The treatment of early syphilis. Frederick Plotke, Jack Rodriquez, and George X. Schwemlein. Am. J. Syph., Gonor. & Ven. Dis., 35 : 240–245, May 1951.

At the Chicago Intensive Treatment

Center, 228 patients with darkfield-positive primary and secondary syphilis were given 4.8 million units of crystalline penicillin G over a 7½-day period. The cumulative failure rate, regardless of diagnosis, was 13.7 percent at the end of a 12- to 15-month observation period. Increasing the total dosage from 2.4 to 4.8 million units is of little significance in lowering cumulative failure rates.

One-injection schedule for the treatment of early syphilis. Jack Rodriquez, George X. Schwemlein, and Frederick Plotke. Am. J. Syph., Gonor. & Ven. Dis., 35: 246–251, May 1951.

Of 71 patients with darkfield-positive lesions of syphilis given one injection of 2.4 million units of crystalline procaine penicillin G, the cumulative result by the end of a 6- to 7-month period was 70.0 percent clinically and serologically negative. Effective blood levels were maintained for 100 percent of the patients for 96 hours. Preliminary results of this study present clinical evidence that a one-injection schedule is effective in the treatment of early syphilis.

Penicillin therapy of cardiovascular syphilis with large total dosage. Its rationale based on histologic studies. Walter L. Bruetsch. Am. J. Syph., Gonor. & Ven. Dis., 35: 252–254, May 1951.

A review of the literature is given. It is the opinion of the author that the occurrence of untoward reactions, when cardiovascular syphilis is treated with penicillin, has been overemphasized. Penicillin may be safely administered in unrestricted dosage from the start without any preparatory heavy metal treatment. In patients with syphilitic aneurysm where the aortic wall is already paper thin, penicillin therapy will not prevent a possible rupture. Because of the resistance of the syphilitic exudate, a dosage of approximately 25 million units is needed for the successful therapy of syphilitic cardiovascular disease.

The occurrence of the Jarisch-Herxheimer reaction in a patient with gummatous syphilitic aortitis. C. Merrill Whorton and Sam Wesley Denham. Am. J. Syph., Gonor. & Ven. Dis., 35: 255–262, May 1951.

Case history of a 27-year-old Negro woman with gummatous syphilitic aortitis and aortic insufficiency, who died 27 hours after the beginning of penicillin therapy, is presented. There was a marked acute inflammatory reaction in the aortic lesions at autopsy, which was interpreted as the histologic manifestation of a Jarisch-Herxheimer reaction.

Saccular aneurysm of the aorta in a 32-year-old man with persistently negative serologic tests. Alfred Kahn, Jr. and M. J. Kilbury. Am. J. Syph., Gonor. & Ven. Dis., 35: 263–269, May 1951.

Case history is presented of a white male who had a saccular aortic aneurysm with persistently negative serologic tests for over 11 years. There was no suggestion of syphilis in his history. At autopsy aortic lesions with extensive medial scarring and destruction of elastic tissue, typical of syphilitic aortitis, were found.

Homologous serum hepatitis complicating therapeutic malaria for neurosyphilis. Herbert Koteen, Charles A. Kane, and Meyer Rosenberg. Am. J. Syph., Gonor. & Ven. Dis., 35: 270–277, May 1951.

Report is concerned with a small group of neurosyphilis patients inoculated with trophozoite-induced malaria who subsequently developed evidence of serious liver damage. Four patients developed jaundice, while two developed marked hypoalbuminemia. The authors believed these were attributable to homologous serum hepatitis.

Clinical follow-up studies on 130 cases of long-standing paretic neurosyphilis treated with penicillin. Augustus S. Rose and Lida R. Carmen. Am. J. Syph., Gonor. & Ven. Dis., 35: 278–283, May 1951.

Report concerns penicillin-treated paretic neurosyphilis patients transferred to the Boston Psychopathic Hospital between February 1944 and July 1949 from other State hospitals. All had been hospitalized for an average of 22 months prior to administration of penicillin. Each had received bismuth, Mapharsen, and/or Tryparsamide as the only treatment. Of the 104 who received fever therapy plus penicillin and the 26 who received penicillin alone, 42 percent are in the community, 49 percent remain hospitalized, and 9 percent are dead after 2½ to 6 years following therapy.

Involvement of the stomach in early syphilis, "precocious tertiarism." Report of a case. C. D. Bell. Am. J. Syph., Gonor. & Ven. Dis., 35: 284–290, May 1951.

The patient, a 25-year-old Negro man, was admitted to the hospital with the complaint of a stomach pain for 5 days. Past history was uneventful except for a gonococcus infection 2 years previously. Serologic test was negative following treatment and remained so at irregular examinations, the last of which was a month previous to admission. Patient was given a daily dose of 0.04 gm. arsenoxide for 4 days; 2.4 million units of aqueous penicillin, 40,000 units every 3 hours; 0.26 gm. of bismuth subsalicylate in oil, weekly for 10 weeks. Patient recovered.

A simple stain for Donovan bodies for the diagnosis of granuloma inguinale. Robert B. Greenblatt, Robert B. Dienst, and Robert M. West. Am. J. Syph., Gonor. & Ven. Dis., 35: 291–293, May 1951.

A technic for staining Donovan bodies is described. The smear slide is flooded with a solution of pinacyanole dye in methyl alcohol. Capsules of the Donovan bodies stain a purplish pink and the nuclei stain a dark blue. Pathognomonic cells are more frequently found in smears when obtained in the manner described.

Nine cases of granuloma inguinale treated with Chloromycetin. Milton Zises and George C. Smith. Am. J. Syph., Gonor. & Ven. Dis., 35: 294–296, May 1951.

Chloromycetin was administered orally, 500 mg. every 6 hours for a 12½-day period. All patients responded most satisfactorily, and all lesions showed remarkable healing prior to discharge from the hospital. During a follow-up of 2½ months to 1 year, no relapses were observed.

## AM. PRACT. & DIGEST TREAT., PHILADELPHIA

A new form of penicillin, with anti-allergic properties. Elmer R. Kadison, Sachiko Janet Ishihara, and Thora Waters. Am. Pract. & Digest Treat., 2: 411–413, May 1951.

A study is described of the use of a substitute for procaine penicillin, the penicillin salt of 1,2-diphenyl-2-methylaminoethanol penicillin, which showed antiallergic properties. The new salt of penicillin, commercially known as P-92, was used successfully in patients requiring penicillin therapy, including four with acute gonorrhea. All patients treated with P-92 had the same response and in the same manner as might have been expected from the use of procaine penicillin.

Problems and their management in central nervous system and cardiovascular syphilis. Henry Packer. Am. Pract. & Digest Treat., 2: 422–427, May 1951.

In this paper the author discusses the questions of how to determine when the patient has received maximum benefit from therapy, whether penicillin has completely replaced fever therapy, and whether treatment of cardiovascular syphilis with penicillin is safe and beneficial. Author believes that penicillin has greatly simplified the treatment of both neurosyphilis and cardiovascular syphilis and for most aspects of these complications of late syphilis it appears to be at least the equal of other forms of therapy.

## ANN. NEW YORK ACAD. SC., NEW YORK

Universal serologic reaction in leprosy. Reuben L. Kahn. Ann. New York Acad. Sc., 54: 40–47, Mar. 30, 1951.

In this report, universal serologic reactions in normal human beings, in syphilis and yaws, and in leprosy are described. The serologic pattern of the universal reaction in lepromatous leprosy is said to be distinctive and different from the pattern noted in certain other diseases such as syphilis, yaws, malaria, and tuberculosis. In practice, not every patient with lepromatous leprosy shows a distinctive pattern due, it is believed, to intercurrent diseases, especially syphilis.

Universal serologic reaction in leprosy. J. Thiers Pinto and Arnaldo Zeo. Ann.

ANN. NEW YORK ACAD. SC.—Continued

New York Acad. Sc., 54 : 48–52, Mar. 30, 1951.

In this study, the universal reaction was applied to a group of five patients with lepromatous leprosy, all of whom had histories of syphilis. The serologic patterns of four of the patients were atypical on the first examination. One gave a serologic pattern of syphilis. After therapy, all the patients gave patterns quite typical of lepromatous leprosy.

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### BULL. WORLD HEALTH ORGAN., GENEVA

Gonorrhea among merchant seamen in Finland : material collected 1946–9, and the official measures to prevent the danger. Tauno Putkonen. Bull. World Health Organ., 4 : 121–129, No. 1, 1951.

An analysis of statistics compiled by the State Medical Board on gonorrhea in Finland is presented. During the period 1946 to 1949 seamen represented 10.5 percent of the total male gonorrhea patients. While the total incidence of gonorrhea among males decreased in 1947 and 1948, the proportion of sailors increased from 9.7 to 13.3 percent, and the incidence among the seamen was 11 times greater in 1947 and almost 16 times greater in 1948 than among the rest of the population.

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### CEYLON SAN. INSPECTOR, COLOMBO

A plan for a venereal disease case finding program by educational methods. D. T. S. S. Gunewardene. Ceylon San. Inspector, 11 : 14–18, No. 2.

A plan for a venereal disease case-finding program by educational methods, based upon the scheme used in the Philadelphia campaign, is presented for use in Ceylon.

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### J. INSUR. MED., LOUISVILLE

Cardiovascular syphilis. Gerald Flaum and Evan W. Thomas. J. Insur. Med., 6 : 27–30, Mar.–Apr.–May 1951.

Incidence, pathology, diagnosis, prognosis, and treatment of cardiovascular syphilis are discussed. Authors recommend that all patients with cardiovascular syphilis who have not had previous adequate antisyphilitic therapy be given a full course of treatment with penicillin.

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### J. INVEST. DERMAT., BALTIMORE

Studies on the life cycle of spirochetes. VIII. Summary and comparison of observations on various organisms. Edward D. DeLamater, Merle Haanes, Richter H. Wiggall, and Donald M. Pillsbury. J. Invest. Dermat., 16 : 231–256, Apr. 1951.

In this study the authors correlate and compare the observations made on the nonpathogenic Nichols strain of *Treponema pallidum* both as it occurs in thioglycollate medium and as it occurs in the embryonated egg under anaerobic conditions; the Kazan, Reiter, and Noguchi strains of nonpathogenic *T. pallidum* as they occur in thioglycollate medium; and the pathogenic *T. pallidum* as it occurs in the experimental syphiloma in rabbit testes. Preliminary observations on *Borrelia anserinum* and *Borrelia novyi* are also cited.

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### J. NEUROPATH. & EXPER. NEUROL., BALTIMORE

Paralysis caused by penicillin injection; mechanism of complication—a warning. I. M. Tarlov, I. Perlmutter, and A. J. Berman. J. Neuropath. & Exper. Neurol., 10 : 158–176, Apr. 1951.

A case report is presented of a 51-year-old man who developed almost complete sciatic paralysis immediately following the intragluteal injection of penicillin, and results of experiments in rabbits are reported which clarify the mechanism that produces severe peripheral neuritis as an immediate complication of the intramuscular injection of penicillin. The neuritis is attributable to the introduction of the material directly into the parenchyma of the nerve. The resultant inflammatory reactions are much more intense with the oily than with the soluble penicillin. Streptomycin injections produced similar reactions. The authors warn that when administering penicillin or any other form of intramuscular therapy, it is imperative to make injections remote from the site of any of the large nerve trunks. The chosen site for intragluteal injections should be the upper outer quadrant.

J. PHILIPPINE M. A., MANILA

Venereal disease in female vagrants. Antonio A. Lozano. J. Philippine M. A., 27 : 171–174, Mar. 1951.

Of 1,028 women arrested for vagrancy, loitering, and other charges, and examined in the clinics of the Manila Rapid Treatment Center from 1947 to 1949, 47.2 percent were found to be infected with venereal diseases and 24.3 percent had the diseases in the infectious stage.

J. SOCIAL HYG., NEW YORK

Civilian-military cooperation in venereal disease control. Harry Pariser. J. Social Hyg., 37 : 223–232, May 1951.

Close liaison between the Norfolk, Va., health department and military personnel with rapid exchange of information results in effective epidemiologic work in a community with an exceptionally high proportion of military to civilian population. Civilian medical consultation service and instruction for naval physicians engender good personal relationship between medical staffs.

J. SOUTH CAROLINA M. A., FLORENCE

A report on the safety and therapeutic effectiveness of parenterally administered Chloromycetin by the intramuscular and intravenous routes. Vince Moseley and Waddy G. Baroody. J. South Carolina M. A., 47 : 157–159, May 1951.

A study is reported of the clinical and therapeutic effects and of the serum levels of Chloromycetin that are obtained when this drug is administered parenterally by intravenous and intramuscular routes. A total of 34 patients with a variety of infectious diseases (including lymphogranuloma venereum) were treated with Chloromycetin administered intramuscularly. Some patients received the drug by both parenteral routes. No allergic or toxic reactions were observed.

M. J. AUSTRALIA, SYDNEY

Syphilis of the pulmonary artery. C. Engel. M. J. Australia, 1 : 749–751, May 26, 1951.

Case history is given of a 50-year-old man. Autopsy revealed cirrhosis of the liver and well-extended, well-advanced typical syphilitic changes of the intima of the pulmonary artery. In 30 years of searching, this was the only case the author found.

M. PRESS, LONDON

The modern treatment of cardiovascular syphilis. Ernest E. Prebble. M. Press, No. 5843 : 415–418, May 2, 1951.

In this article, diagnosis and treatment of aortitis, aneurysm, and aortic valvular disease, three of the commoner cardiovascular syphilitic diseases, are discussed in detail.

Some aspects of the problem of congenital syphilis. W. V. Macfarlane. M. Press, No. 5847 : 547–555, May 30, 1951.

Diagnosis and treatment of congenital syphilis, based upon a study of 255 patients, are reviewed. Occupations, modes of referral of patients, medical examination of other members of the family, medicosocial problems associated with congenital syphilis, and premarital examination are among the points discussed.

M. WORLD, LONDON

The ideal treatment for gonorrhea. R. R. Willcox. M. World, 74 : 318–322, May 18, 1951.

The ideal drug for the treatment of gonorrhea is one which is nontoxic, can be given in a single oral dose, will cure 95 percent of cases, will not produce resistance in failures, and will not mask syphilis. The five drugs available for the treatment of gonorrhea are penicillin, streptomycin, aureomycin, chloramphenicol, and terramycin. The author discusses how far these five preparations fall short of the criteria set for the ideal drug, and concludes by saying that the ideal drug for the treatment of gonorrhea has not yet been discovered.

MED. ILLUSTRATED, LONDON

Some corneal abnormalities. Alex G. Cross. Med. Illustrated, 5 : 212–216, May 1951.

Corneal abnormalities are classified as traumatic, inflammatory, and degenerative, and their causes, pathology, diagnosis, and treatment are discussed. Among the inflammatory abnormalities the author includes interstitial keratitis, due

MED. ILLUSTRATED, LONDON—Continued

to congenital syphilis, and which, with Hutchinson's teeth and deafness, forms the Hutchinson triad. Serious corneal lesions by the gonococcus are rarely found in these days, due to the prophylactic and therapeutic effects of the sulfonamides and other chemotherapeutic drugs.

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MISSISSIPPI VALLEY M. J., QUINCY

Practical office procedures in gynecology. Walter J. Reich, Mitchell J. Nechtow, and Alvin M. Kurzon. Mississippi Valley M. J., 73: 71–73, May 1951.

Diagnosis and treatment of various gynecologic disorders, including trichomonas vaginitis and condyloma acuminata, are discussed.

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PRACTITIONER, LONDON

Leucorrhoea. H. H. Fouracre Barns. Practitioner, 166: 583–587, June 1951.

A review of the etiology and treatment of leukorrhea is presented. Among the causes considered the author includes gonorrhea and *Trichomonas vaginalis.*

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QUART. BULL., NORTHWESTERN UNIV. M. SCHOOL, CHICAGO

The Charcot knee. A new method of fusion. James K. Stack and William Lichtman. Quart. Bull., Northwestern Univ. M. School, 25: 68–72, Spring 1951.

The literature is reviewed, and case reports are presented of seven patients with Charcot knees operated on with a new method of fusion, using an intramedullary nail. All patients had either a positive serology or a past history of syphilis. Advantages of the new method include a relatively short period of bed rest and early ambulation. Also, because of the internal fixation principle, a hip spica cast is not required.

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SCIENCE, WASHINGTON

Isolation of pleuropneumonialike organisms from the throats of humans. Paul F. Smith and Harry E. Morton. Science, 113: 623–624, June 1, 1951.

A review of the literature is presented. In a study of 114 throat cultures the authors found that a total of 38 (33.6 percent) yielded pleuropneumonia-like organisms.

SIGHT-SAVING REV., NEW YORK

The blindness research program of the U. S. Public Health Service. W. H. Sebrell, Jr. Sight-Saving Rev., 21: 77–80, Summer 1951.

This is an extract of a paper presented at the Conference of the National Society for the Prevention of Blindness, March 28, 1951. Author describes the prospective program of the National Institute of Neurological Diseases and Blindness and points out the function of voluntary agencies in forwarding such a program. He thinks one of the most important activities of the Public Health Service, directly and indirectly related to blindness prevention, has been the vigorous Nationwide fight against venereal diseases over the past 15 years.

The government agency in prevention of blindness—a panel discussion. Carl E. Rice. Sight-Saving Rev., 21: 91–97, Summer 1951.

Excerpts of discussions presented at the Annual Conference of the National Society for the Prevention of Blindness, March 29, 1951, review activities of Federal, State, and local health agencies in the fight against blindness and their plans for the future. The Division of Venereal Disease, Public Health Service, is said to have played an important role in sight conservation by bringing about a decrease in the amount of gonorrheal infections and syphilis.

A public health approach to the prevention of blindness. Leonard A. Scheele. Sight-Saving Rev., 21: 98–102, Summer 1951.

In this paper, presented at the Conference of the National Society for the Prevention of Blindness, March 29, 1951, the problem of blindness due to conditions arising from chronic illness and old age is reviewed. During the past 15 years, blindness due to syphilis is reported to have decreased by 50 percent, and since 1908 blindness due to eye infections in the newborn has dropped by about 90 percent.

Silver nitrate favored. Note and Comment. Sight-Saving Rev., 21: 114, Summer 1951.

The National Society for the Prevention of Blindness went on record as favor-

### Sight-Saving Rev., New York—Cont.

ing continued use of 1-percent silver nitrate solution as the preferred prophylactic agent in preventive treatment of ophthalmia neonatorum. This action was taken by 25 medical consultants of the Society at a meeting in Atlantic City.

### South African M. J. Cape Town

Syphilitic cold haemoglobinuria. Report of a case with a brief review of the disease. Peter V. Suckling. South African M. J., 25 : 238–240, Apr. 7, 1951.

A case of cold hemoglobinuria with congenital syphilis in a 6-year-old Negro is presented. The history, clinical features, and diagnosis of the disease are discussed.

The effects of syphilis on the outcome of pregnancy in the native. A clinical and statistical survey. S. B. Sachs. South African M. J., 25 : 255–259, Apr. 14, 1951.

In a survey of 1,329 pregnancies of native mothers free from syphilis and a similar number with latent syphilis, the difference in the groups showed an overall wastage in fetal and early infant life of 7.4 percent due to syphilis. Latent syphilis accounted for an increase of 3.2 percent in the combined abortion and stillbirth rate.

### Survey, New York

For sale: World health. Hillier Krieghbaum. Survey, 87 : 288–290, June 1951.

This general report on the activities of the WHO includes a discussion of malaria, tuberculosis, and venereal diseases control programs.

### Texas Rep. Biol. & Med., Galveston

Mechanisms of antibiotic action and trends in antibiotic chemotherapy. Robertson Pratt and Jean Dufrenoy. Texas Rep. Biol. & Med., 9 : 76–144, Spring 1951.

This review deals principally with investigations of the mechanisms of antibiotic action on micro-organisms and their relations to trends that have developed in antibiotic chemotherapy in the last 2 years. The action of penicillin, streptomycin, chloramphenicol, aureomycin, and terramycin is discussed, as well as development of resistant microorganisms and effects of antibiotic therapy on antibody formation and resistance to reinfection. The two important developments in the practical use of antibiotics that have occurred since 1948, namely, the trends toward discontinuous instead of continuous therapy and toward multiple or polyantibiotic therapy, are discussed.

### Tr. Roy. Soc. Trop. Med. & Hyg., London

The FOREAMI. R. Mouchet. Tr. Roy. Soc. Trop. Med. & Hyg., 44 : 483–500, Apr. 1951.

History and program of the "Fonds Peine Elisabeth pour l'Assistance Medicale aux Indigenes," an organization established in 1930 for the improvement of the medical care given to inhabitants of the Belgian Congo, are presented. Statistics on incidence of various diseases, including yaws and syphilis, from 1931 to 1949 are given.

### Tr. & Stud., Coll. Physicians, Philadelphia, Philadelphia

Newer developments in venereal disease control in the United States and abroad. Norman R. Ingraham, Jr. Tr. & Stud., Coll. Physicians, Philadelphia, 19 : 25–32, Apr. 1951.

In this paper, read before the College of Physicians of Philadelphia, Section on Public Health, Preventive and Industrial Medicine, January 19, 1951, basic developments in the last decade, WHO studies, studies in the immunology of syphilis, simplification of syphilis therapy, development of treatment prophylaxis, eradication of congenital syphilis, and basic maintenance control program for the venereal diseases were discussed.

### Univ. Michigan M. Bull., Ann Arbor

Reiter's syndrome: Apparent recovery following treatment with aureomycin. Arthur H. Griep and Charles F. Leich. Univ. Michigan M. Bull., 17 : 18–21, Jan. 1951.

A 17-year-old white male patient with severe keratoconjunctivitis, arthritis, and urethritis was treated with a dose of 1,000 mg. of aureomycin administered orally every 8 hours. Within 36 hours, a marked diminution in photophobia and ocular pain, with disappearance of the urethral discharge and decreased joint pain and swelling, was noted.

UROL. & CUTAN. REV., WEST PALM BEACH

**Venereal diseases in Turkey. R. R. Willcox. Urol. & Cutan. Rev., 55: 27–37, Jan. 1951.**

This is a report on a survey undertaken by the author in the urban areas of Ankara, Izmir, and Istanbul, Turkey. Geography, historical background, hospital facilities, legislation for venereal disease control, incidence of syphilis and gonorrhea from 1926 to 1948, problem of prostitution, and treatment facilities are discussed.

**Combined aureomycin and Chloromycetin therapy of gonorrhea. Calvin H. Chen, Robert B. Dienst, and Robert B. Greenblatt. Urol. & Cutan. Rev., 55: 147–148, Mar. 1951.**

A report is presented on the successful treatment of 19 unselected patients with laboratory proved gonorrhea. Each of the patients received three capsules (250 mg.) of aureomycin and three capsules (250 mg.) of Chloromycetin.

**Fungal, viral, spirochetal, proto- or metazoan infection or infestation of the urinary tract, particularly in relation to abacterial pyuria. Waldemar E. Coutts, Roberto Vargas-Zalazar, and Edna Silva. Urol. & Cutan. Rev., 55: 148–159, Mar. 1951.**

An extensive review on diagnosis and treatment of abacterial pyuria and its relation to other infections, including Reiter's syndrome, lymphogranuloma venereum, gonorrhea, and *Trichomonas vaginalis*, is presented.

**Rapid treatment of acute gonorrhea in males with oral aureomycin. Louis T. Wright, William I. Metzger, Malcolm S. Beinfield, James C. DiLorenzo, and Milton Marmell. Urol. & Cutan. Rev., 55: 203–206, Apr. 1951.**

In this study a total of 63 patients, at the Venereal Disease Clinic of Harlem Hospital, were treated with a total dosage of 1 gm. of oral aureomycin (one 500-mg. capsule initially and a second 500-mg. capsule 6 hours later). Clinical symptoms and bacteriologic smears and cultures became negative in almost every instance within 24 hours after treatment. With 3 failures in the entire group, the cure rate was 95.2 percent.

**Certain fallacies in the diagnosis of syphilis. Paul Fasal. Urol. & Cutan. Rev., 55: 297–301, May 1951.**

In this general discussion, common sources of error in the diagnosis of syphilis of the skin are reviewed. Author believes the maxim to perform blood tests for syphilis in any suspicious skin condition is sound provided it is realized that a positive outcome of the test does not necessarily prove the syphilitic origin of the skin condition in question. Ten case histories are presented as illustrations in which skin manifestations were falsely diagnosed and treated as syphilitic. Five of the patients showed biologic false-positive reactions and five actually had syphilis.

WEST. J. SURG., PORTLAND

**The care of the eyes in the newborn. A report on 4,500 cases. Morris Leff. West. J. Surg., 59: 176–177, Apr. 1951.**

A plea is made for the abolition of silver nitrate as a prophylaxis in the eyes of the newborn because of its irritating effects. At the Central Maternity Hospital, New York City, the eyes of 4,500 newborn babies were simply flushed with 90 cc. of sterile water, with no irritating results and no infections. As penicillin is a positive cure for gonorrheal ophthalmia, the author believes the routine prophylaxis for newborn babies is no longer necessary. It is his opinion that the thousands of babies who are not exposed to gonorrheal infection should not be subjected to any irritating chemicals, while those who might develop it should receive intensive penicillin therapy, as the single-drop measure would be ineffective either for prophylaxis or for treatment.

# STATISTICS

## Cases of Syphilis and Gonorrhea Reported to the Public Health Service by City Health Departments, Fiscal Years 1941–51

[Known military cases excluded]

| City | 1941 | 1942 | 1943 | 1944 | 1945 | 1946 | 1947 | 1948 | 1949 | 1950 | 1951 [1] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTAL SYPHILIS | | | | | | | | | | | |
| Akron | 796 | 847 | 1,284 | 886 | 982 | 900 | 971 | 676 | 687 | 571 | 389 |
| Atlanta | 4,574 | 3,306 | 4,082 | 2,764 | 2,573 | 1,972 | 3,113 | 2,929 | 1,808 | 1,553 | 1,136 |
| Baltimore | 7,502 | 7,855 | 15,353 | 9,808 | 7,526 | 6,647 | 5,453 | 5,029 | 4,954 | 3,478 | 2,619 |
| Birmingham | 5,337 | 5,035 | 6,266 | 5,036 | 2,394 | 6,045 | 3,637 | 2,324 | 1,967 | 1,854 | 1,700 |
| Boston | 1,595 | 1,754 | 2,048 | 1,852 | 1,565 | 1,652 | 1,514 | 1,060 | 913 | 653 | 527 |
| Buffalo | 1,497 | 1,538 | 1,910 | 1,962 | 1,622 | 1,438 | 1,415 | 1,280 | 1,235 | 832 | 812 |
| Chicago | 12,186 | 14,916 | 16,981 | 16,434 | 15,554 | 15,463 | 14,329 | 11,689 | 9,358 | 7,402 | 5,994 |
| Cincinnati | 2,994 | 2,898 | 3,693 | 2,967 | 2,404 | 2,382 | 2,875 | 2,687 | 2,311 | 1,672 | 1,424 |
| Cleveland | 3,101 | 3,278 | 4,054 | 4,473 | 4,362 | 3,820 | 3,440 | 2,719 | 2,392 | 2,194 | 1,763 |
| Columbus | 1,200 | 1,336 | 1,599 | 1,581 | 1,331 | 1,418 | 1,489 | 1,305 | 1,089 | 839 | 762 |
| Dallas | 3,314 | 2,957 | 3,212 | 2,545 | 1,835 | 1,711 | 1,503 | 1,230 | 1,473 | 854 | 1,042 |
| Dayton | 849 | 783 | 1,311 | 1,650 | 1,074 | 1,054 | 1,161 | 1,233 | 923 | 695 | 894 |
| Denver | 1,841 | 2,233 | 2,250 | 1,783 | 1,375 | 1,246 | 993 | 920 | 734 | 463 | 300 |
| Detroit | 5,820 | 6,854 | 9,511 | 11,875 | 9,831 | 8,837 | 9,103 | 7,342 | 4,933 | 4,665 | 5,083 |
| Honolulu | 321 | 439 | 669 | 528 | 260 | 386 | 674 | 490 | 329 | 335 | 257 |
| Houston | 3,374 | 3,390 | 4,179 | 1,956 | 1,779 | 2,167 | 1,881 | 1,800 | 1,419 | 1,080 | 1,022 |
| Indianapolis | 1,247 | 2,058 | 3,871 | 2,270 | 2,130 | 1,718 | 2,328 | 1,794 | 1,589 | 1,208 | 1,423 |
| Jersey City | 455 | 564 | 689 | 480 | 340 | 417 | 498 | 474 | 517 | 419 | 470 |
| Kansas City | 544 | 1,652 | 1,962 | 1,861 | 1,433 | 1,485 | 1,060 | 951 | 794 | 723 | 505 |
| Los Angeles | 6,791 | 6,329 | 10,232 | 11,438 | 12,223 | 9,159 | 9,967 | 6,894 | 5,517 | 3,694 | 2,684 |
| Louisville | 1,962 | 2,198 | 2,435 | 1,960 | 1,180 | 1,737 | 1,909 | 1,805 | 1,484 | 988 | 811 |
| Memphis | 8,750 | 7,744 | 8,015 | 7,699 | 6,447 | 5,258 | 4,374 | 3,370 | 2,467 | 2,090 | 1,804 |
| Milwaukee | 557 | 513 | 561 | 486 | 714 | 792 | 806 | 864 | 891 | 819 | 744 |
| Minneapolis | 700 | 816 | 840 | 714 | 573 | 583 | 633 | 445 | 286 | 207 | 252 |
| Newark | 2,535 | 3,278 | 2,394 | 2,130 | 1,802 | 1,762 | 1,818 | 1,457 | 1,689 | 1,343 | 926 |
| New Orleans | 957 | 2,086 | 3,217 | 2,286 | 1,708 | 2,296 | 2,815 | 2,420 | 2,323 | 1,299 | 1,226 |
| New York | 29,787 | 29,074 | 26,621 | 24,932 | 23,495 | 25,122 | 25,586 | 26,726 | 21,823 | 20,430 | 22,369 |
| Oakland | 755 | 765 | 1,475 | 1,862 | 1,927 | 1,778 | 1,703 | 1,404 | 1,023 | 823 | 645 |
| Oklahoma City | 664 | 2,387 | 2,240 | 1,979 | 1,161 | 1,535 | 1,549 | 1,119 | 729 | 695 | 672 |
| Omaha | 427 | 931 | 999 | 603 | 532 | 1,001 | 1,173 | 776 | 658 | 626 | 439 |
| Philadelphia | 6,449 | 2,489 | 5,259 | 9,690 | 6,434 | 7,642 | 9,000 | 8,059 | 7,015 | 5,697 | 4,282 |
| Pittsburgh | 3,048 | 5,768 | 5,404 | 1,949 | 1,455 | 1,753 | 2,334 | 1,875 | 1,478 | 1,013 | 961 |
| Portland | 643 | 511 | 714 | 931 | 801 | 677 | 651 | 653 | 433 | 375 | 194 |
| Providence | 652 | 719 | 532 | 471 | 509 | 715 | 599 | 493 | 460 | 370 | 377 |
| Rochester | 312 | 283 | 317 | 275 | 309 | 340 | 479 | 370 | 270 | 259 | 220 |
| St. Louis | 7,202 | 9,266 | 4,331 | 6,330 | 6,090 | 7,980 | 7,054 | 4,386 | 3,300 | 2,880 | 2,540 |
| St. Paul | 367 | 385 | 498 | 286 | 238 | 242 | 297 | 208 | 153 | 98 | 87 |
| San Antonio | 2,042 | 2,028 | 1,861 | 1,207 | 1,195 | 1,333 | 1,895 | 2,961 | 1,413 | 469 | 270 |
| San Diego | 800 | 753 | 1,200 | 1,118 | 1,319 | 878 | 668 | 547 | 552 | 396 | 280 |
| San Francisco | 2,546 | 2,113 | 3,481 | 2,937 | 2,847 | 3,476 | 3,226 | 1,950 | 1,556 | 1,200 | 869 |
| Seattle | 1,397 | 1,219 | 1,403 | 1,373 | 1,418 | 1,086 | 756 | 585 | 483 | 429 | 271 |
| Syracuse | 856 | 585 | 936 | 921 | 584 | 560 | 409 | 390 | 354 | 242 | 204 |
| Toledo | 674 | 661 | 798 | 904 | 601 | 647 | 740 | 637 | 494 | 293 | 530 |
| Washington, D. C | 8,388 | 10,017 | 7,747 | 8,261 | 3,938 | 3,220 | 4,245 | 3,916 | 3,606 | 3,036 | 3,279 |

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[1] Provisional.

Source: Forms PHS-688-562—FSA—PHS—Division of Venereal Disease, Office of Statistics, 8/21/51 (ML-JNH) mdp.

## Cases of Syphilis and Gonorrhea Reported to the Public Health Service by City Health Departments, Fiscal Years 1941–51—Continued

[Known military cases excluded]

| City | 1941 | 1942 | 1943 | 1944 | 1945 | 1946 | 1947 | 1948 | 1949 | 1950 | 1951 [1] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PRIMARY AND SECONDARY SYPHILIS | | | | | | | | | | | |
| Akron | 184 | 133 | 179 | 137 | 257 | 233 | 294 | 125 | 58 | 49 | 18 |
| Atlanta | 101 | 926 | 891 | 670 | 735 | 623 | 919 | 758 | 537 | 387 | 307 |
| Baltimore | 987 | 853 | 1, 048 | 1, 282 | 1, 486 | 1, 888 | 1, 943 | 1, 468 | 1, 022 | 526 | 240 |
| Birmingham | 749 | 703 | 540 | 314 | 332 | 1, 013 | 1, 032 | 700 | 552 | 304 | 154 |
| Boston | 176 | 297 | 323 | 355 | 354 | 619 | 480 | 310 | 209 | 112 | 72 |
| Buffalo | 161 | 168 | 158 | 222 | 269 | 445 | 382 | 229 | 160 | 80 | 48 |
| Chicago | 1, 037 | 1, 744 | 2, 316 | 2, 466 | 2, 805 | 3, 863 | 3, 921 | 2, 814 | 1, 955 | 1, 105 | 637 |
| Cincinnati | 284 | 306 | 430 | 425 | 450 | 581 | 772 | 640 | 349 | 210 | 117 |
| Cleveland | 357 | 577 | 687 | 859 | 849 | 963 | 910 | 569 | 365 | 160 | 127 |
| Columbus | 151 | 158 | 215 | 341 | 435 | 458 | 402 | 298 | 115 | 79 | 44 |
| Dallas | 533 | 449 | 440 | 506 | 500 | 630 | 741 | 542 | 415 | 197 | 113 |
| Dayton | 123 | 152 | 176 | 180 | 141 | 287 | 324 | 173 | 130 | 59 | 41 |
| Denver | 395 | 392 | 436 | 407 | 341 | 460 | 335 | 242 | 169 | 81 | 40 |
| Detroit | 653 | 924 | 1, 203 | 1, 545 | 1, 994 | 1, 877 | 1, 779 | 1, 243 | 689 | 308 | 251 |
| Honolulu | ------- | 98 | 225 | 68 | 33 | 16 | 56 | 76 | 18 | 12 | 6 |
| Houston | 533 | 501 | 319 | 362 | 430 | 654 | 580 | 508 | 298 | 160 | 111 |
| Indianapolis | 365 | 994 | 624 | 509 | 366 | 262 | 547 | 493 | 315 | 137 | 62 |
| Jersey City | 68 | 77 | 58 | 47 | 41 | 106 | 129 | 101 | 69 | 55 | 40 |
| Kansas City | 111 | 213 | 287 | 306 | 289 | 379 | 256 | 236 | 131 | 105 | 78 |
| Los Angeles | 1, 047 | 942 | 1, 044 | 1, 453 | 2, 010 | 1, 874 | 1, 995 | 1, 242 | 812 | 388 | 189 |
| Louisville | 187 | 282 | 298 | 351 | 404 | 787 | 602 | 467 | 281 | 159 | 76 |
| Memphis | 856 | 711 | 654 | 608 | 830 | 825 | 857 | 586 | 456 | 275 | 166 |
| Milwaukee | 88 | 65 | 77 | 66 | 97 | 182 | 200 | 107 | 128 | 101 | 72 |
| Minneapolis | 77 | 113 | 87 | 115 | 131 | 157 | 203 | 89 | 37 | 13 | 14 |
| Newark | 225 | 324 | 319 | 315 | 358 | 480 | 544 | 328 | 286 | 139 | 52 |
| New Orleans | 168 | 28 | ------- | ------- | 147 | 281 | 645 | 427 | 276 | 116 | 76 |
| New York | 3, 211 | 3, 094 | 3, 659 | 4, 579 | 5, 200 | 5, 477 | 5, 677 | 4, 392 | 3, 030 | 1, 666 | 978 |
| Oakland | 102 | 103 | 168 | 189 | 247 | 321 | 418 | 242 | 136 | 76 | 39 |
| Oklahoma City | 66 | 407 | 345 | 267 | 201 | 286 | 362 | 256 | 239 | 134 | 40 |
| Omaha | 97 | 98 | 107 | 68 | 96 | 270 | 251 | 143 | 98 | 35 | 27 |
| Philadelphia | 762 | 261 | 383 | 296 | 767 | 1, 274 | 1, 931 | 1, 488 | 800 | 609 | 383 |
| Pittsburgh | ------- | ------- | ------- | 117 | 280 | 442 | 839 | 610 | 377 | 107 | 50 |
| Portland | 104 | 98 | 143 | 266 | 271 | 175 | 242 | 173 | 107 | 54 | 27 |
| Providence | 53 | 65 | 30 | 66 | 84 | 177 | 147 | 56 | 47 | 15 | 5 |
| Rochester | 23 | 20 | 48 | 47 | 64 | 124 | 124 | 95 | 50 | 16 | 10 |
| St. Louis | 503 | 651 | 536 | 859 | 1, 225 | 2, 045 | 2, 198 | 925 | 546 | 371 | 223 |
| St. Paul | 21 | 17 | 54 | 32 | 29 | 55 | 112 | 58 | 19 | 8 | 8 |
| San Antonio | 112 | 210 | 135 | 163 | 172 | 310 | 281 | 244 | 90 | 46 | 23 |
| San Diego | 194 | 136 | 102 | 135 | 207 | 215 | 192 | 144 | 100 | 34 | 10 |
| San Francisco | 538 | 390 | 411 | 386 | 506 | 977 | 891 | 640 | 373 | 226 | 85 |
| Seattle | 215 | 172 | 175 | 206 | 286 | 226 | 249 | 197 | 143 | 92 | 52 |
| Syracuse | 13 | 11 | 19 | 24 | 64 | 116 | 98 | 48 | 29 | 13 | 5 |
| Toledo | 54 | 59 | 108 | 129 | 119 | 196 | 173 | 103 | 58 | 26 | 12 |
| Washington, D. C | ------- | ------- | 1, 087 | 1, 070 | 883 | 921 | 1, 579 | 1, 228 | 858 | 334 | 82 |

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[1] Provisional.

Source: Forms PHS-688-562—FSA-PHS—Division of Venereal Disease, Office of Statistics, 8/21/51 (ML-JNH) mdp.

## Cases of Syphilis and Gonorrhea Reported to the Public Health Service by City Health Departments, Fiscal Years 1941–51—Continued

[Known military cases excluded]

| City | 1941 | 1942 | 1943 | 1944 | 1945 | 1946 | 1947 | 1948 | 1949 | 1950 | 1951 [1] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| EARLY LATENT SYPHILIS | | | | | | | | | | | |
| Akron | 165 | 172 | 248 | 209 | 240 | 233 | 249 | 188 | 193 | 126 | 79 |
| Atlanta | 3, 345 | 1, 568 | 1, 508 | 822 | 772 | 672 | 1, 036 | 1, 012 | 701 | 579 | 355 |
| Baltimore | 222 | 591 | 1, 090 | 1, 275 | 1, 730 | 1, 692 | 1, 335 | 1, 467 | 1, 260 | 780 | 680 |
| Birmingham | 1, 311 | 1, 639 | 1, 829 | 1, 213 | 591 | 3, 270 | 1, 215 | 973 | 704 | 610 | 511 |
| Boston | ------ | ------ | ------ | ------ | ------ | ------ | 156 | 155 | 127 | 114 | 84 |
| Buffalo | 25 | 29 | 93 | 222 | 236 | 248 | 204 | 119 | 76 | 47 | 32 |
| Chicago | 1, 960 | 3, 021 | 3, 630 | 3, 680 | 3, 999 | 4, 767 | 4, 734 | 3, 931 | 3, 217 | 2, 517 | 1, 995 |
| Cincinnati | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 521 | 866 | 583 | 485 |
| Cleveland | 824 | 860 | 1, 000 | 1, 424 | 1, 422 | 1, 327 | 1, 388 | 1, 143 | 958 | 783 | 624 |
| Columbus | 232 | 296 | 337 | 365 | 306 | 459 | 592 | 473 | 362 | 240 | 160 |
| Dallas | 802 | 534 | 589 | 554 | 561 | 586 | 398 | 346 | 591 | 329 | 323 |
| Dayton | 177 | 185 | 264 | 457 | 417 | 371 | 387 | 554 | 350 | 245 | 362 |
| Denver | 119 | 254 | 449 | 500 | 387 | 331 | 236 | 221 | 190 | 96 | 61 |
| Detroit | 1, 017 | 1, 372 | 2, 352 | 3, 806 | 3, 386 | 2, 762 | 2, 362 | 1, 976 | 1, 244 | 1, 136 | 1, 188 |
| Honolulu | ------ | 38 | 91 | 62 | 29 | 45 | 87 | 69 | 62 | 42 | 42 |
| Houston | 885 | 1, 124 | 1, 378 | 691 | 735 | 861 | 723 | 746 | 624 | 491 | 450 |
| Indianapolis | 43 | 77 | 73 | 119 | 240 | 111 | 424 | 343 | 382 | 300 | 308 |
| Jersey City | 63 | 78 | 121 | 99 | 117 | 175 | 236 | 200 | 172 | 106 | 162 |
| Kansas City | 137 | 341 | 262 | 343 | 380 | 477 | 367 | 319 | 267 | 230 | 169 |
| Los Angeles | 1, 161 | 1, 404 | 2, 462 | 3, 005 | 2, 718 | 2, 783 | 3, 286 | 1, 928 | 1, 234 | 624 | 494 |
| Louisville | 191 | 381 | 437 | 369 | 268 | 452 | 516 | 422 | 251 | 159 | 144 |
| Memphis | 2, 886 | 2, 443 | 3, 076 | 3, 588 | 3, 063 | 2, 367 | 1, 992 | 1, 521 | 1, 034 | 784 | 457 |
| Milwaukee | 24 | 20 | 5 | 13 | 44 | 128 | 221 | 273 | 208 | 158 | 134 |
| Minneapolis | 105 | 133 | 135 | 133 | 110 | 114 | 113 | 88 | 59 | 31 | 38 |
| Newark | 583 | 660 | 681 | 584 | 570 | 591 | 627 | 590 | 619 | 396 | 264 |
| New Orleans | 329 | 65 | ------ | ------ | 47 | 91 | 409 | 474 | 772 | 288 | 275 |
| New York | 4, 385 | 5, 265 | 5, 098 | 5, 716 | 5, 981 | 7, 016 | 6, 454 | 6, 553 | 5, 049 | 4, 104 | 3, 824 |
| Oakland | 133 | 163 | 361 | 451 | 546 | 691 | 533 | 526 | 285 | 130 | 119 |
| Oklahoma City | 240 | 692 | 709 | 534 | 253 | 366 | 377 | 391 | 207 | 192 | 150 |
| Omaha | 102 | 203 | 242 | 272 | 124 | 344 | 309 | 215 | 144 | 149 | 79 |
| Philadelphia | 1, 245 | 174 | 514 | 814 | 1, 560 | 2, 433 | 3, 551 | 3, 484 | 3, 283 | 2, 323 | 1, 703 |
| Pittsburgh | ------ | ------ | ------ | 229 | 359 | 562 | 619 | 483 | 428 | 279 | 217 |
| Portland | 128 | 114 | 45 | 59 | 88 | 107 | 117 | 107 | 124 | 77 | 41 |
| Providence | 85 | 79 | 37 | 52 | 58 | 73 | 68 | 51 | 81 | 32 | 26 |
| Rochester | 4 | 1 | 4 | 16 | 25 | 40 | 49 | 35 | 29 | 5 | 1 |
| St. Louis | 2, 432 | 3, 239 | 1, 292 | 2, 029 | 1, 973 | 2, 983 | 2, 401 | 1, 599 | 1, 120 | 845 | 738 |
| St. Paul | 37 | 41 | 76 | 42 | 37 | 49 | 50 | 38 | 32 | 17 | 14 |
| San Antonio | 592 | 488 | 484 | 297 | 310 | 585 | 834 | 1, 021 | 654 | 165 | 77 |
| San Diego | 249 | 229 | 412 | 306 | 347 | 238 | 224 | 151 | 125 | 60 | 48 |
| San Francisco | 413 | 437 | 621 | 582 | 522 | 747 | 947 | 496 | 362 | 258 | 181 |
| Seattle | 176 | 189 | 223 | 247 | 379 | 329 | 149 | 136 | 98 | 104 | 56 |
| Syracuse | 5 | 8 | 3 | 28 | 26 | 49 | 39 | 23 | 10 | 1 | 1 |
| Toledo | 70 | 101 | 139 | 151 | 51 | 111 | 196 | 220 | 153 | 123 | 187 |
| Washington, D. C | ------ | ------ | 2, 250 | 1, 968 | 1, 201 | 1, 229 | 1, 508 | 1, 260 | 1, 119 | 950 | 917 |

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[1] Provisional.

Source: Forms PHS-688-562—FSA—PHS—Division of Venereal Disease, Office of Statistics, 8/21/51 (ML-JNH) mdp.

## Cases of Syphilis and Gonorrhea Reported to the Public Health Service by City Health Departments, Fiscal Years 1941–51—Continued

[Known military cases excluded]

| City | 1941 | 1942 | 1943 | 1944 | 1945 | 1946 | 1947 | 1948 | 1949 | 1950 | 1951 [1] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LATE AND LATE LATENT SYPHILIS | | | | | | | | | | | |
| Akron | 407 | 485 | 799 | 501 | 433 | 382 | 395 | 326 | 393 | 344 | 258 |
| Atlanta | 1,118 | 802 | 1,642 | 1,246 | 1,008 | 620 | 1,064 | 1,083 | 530 | 565 | 459 |
| Baltimore | 1,608 | 1,334 | 1,877 | 2,311 | 2,425 | 1,858 | 1,730 | 1,838 | 2,388 | 1,842 | 1,408 |
| Birmingham | 1,051 | 1,263 | 1,636 | 1,233 | 632 | 1,101 | 687 | 430 | 450 | 546 | 806 |
| Boston | 1,125 | 1,055 | 1,478 | 1,182 | 991 | 833 | 781 | 552 | 544 | 398 | 353 |
| Buffalo | 1,263 | 1,293 | 1,588 | 1,472 | 1,072 | 715 | 790 | 900 | 972 | 686 | 712 |
| Chicago | 8,772 | 9,770 | 10,617 | 9,932 | 8,361 | 6,464 | 5,322 | 4,620 | 3,930 | 3.551 | 3,160 |
| Cincinnati | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 729 | 884 | 681 | 668 |
| Cleveland | 1,799 | 1,721 | 2,230 | 2,094 | 2,009 | 1,463 | 1,097 | 942 | 978 | 1,178 | 971 |
| Columbus | 757 | 819 | 985 | 829 | 539 | 455 | 465 | 493 | 572 | 495 | 508 |
| Dallas | 1,940 | 1,942 | 2,151 | 1,466 | 759 | 464 | 329 | 270 | 406 | 305 | 602 |
| Dayton | 497 | 396 | 826 | 958 | 489 | 371 | 435 | 470 | 421 | 368 | 460 |
| Denver | 988 | 1,460 | 1,255 | 656 | 564 | 386 | 336 | 407 | 350 | 252 | 187 |
| Detroit | 3,977 | 4,375 | 5,753 | 6,299 | 4,269 | 4,046 | 4,771 | 3,917 | 2,796 | 3,006 | 2,337 |
| Honolulu | ------ | 78 | 310 | 347 | 174 | 302 | 460 | 301 | 190 | 241 | 177 |
| Houston | 1,185 | 1,174 | 2,377 | 843 | 550 | 601 | 513 | 488 | 442 | 382 | 423 |
| Indianapolis | 262 | 667 | 868 | 557 | 439 | 391 | 874 | 887 | 797 | 733 | 980 |
| Jersey City | 279 | 377 | 480 | 312 | 162 | 121 | 122 | 147 | 261 | 241 | 241 |
| Kansas City | 277 | 930 | 1,233 | 1,106 | 658 | 568 | 410 | 369 | 366 | 360 | 242 |
| Los Angeles | 3,801 | 3,787 | 6,438 | 6,642 | 7,165 | 4,267 | 4,426 | 3,544 | 2,987 | 2,538 | 1,917 |
| Louisville | 953 | 1,037 | 1,447 | 855 | 444 | 396 | 743 | 855 | 906 | 643 | 548 |
| Memphis | 4,800 | 4,328 | 4,111 | 3,374 | 2,372 | 1,978 | 1,436 | 1,204 | 914 | 989 | 983 |
| Milwaukee | 433 | 414 | 472 | 402 | 563 | 465 | 353 | 447 | 520 | 492 | 396 |
| Minneapolis | 496 | 538 | 588 | 440 | 316 | 295 | 297 | 250 | 182 | 156 | 193 |
| Newark | 1,622 | 2,159 | 1,347 | 1,170 | 827 | 654 | 604 | 514 | 745 | 753 | 567 |
| New Orleans | 446 | 110 | ------ | ------ | 73 | 191 | 422 | 290 | 287 | 197 | 333 |
| New York | 19,465 | 18,294 | 16,373 | 13,715 | 11,584 | 11,892 | 12,746 | 14,905 | 12,943 | 13,947 | 16,861 |
| Oakland | 460 | 459 | 887 | 1,158 | 1,075 | 728 | 692 | 576 | 549 | 570 | 440 |
| Oklahoma City | 245 | 869 | 760 | 629 | 313 | 457 | 544 | 380 | 236 | 337 | 453 |
| Omaha | 214 | 573 | 598 | 226 | 290 | 348 | 440 | 291 | 309 | 367 | 265 |
| Philadelphia | 4,166 | 2,002 | 2,702 | 1,050 | 2,059 | 2,889 | 2,871 | 2,645 | 2,730 | 2,622 | 2,089 |
| Pittsburgh | ------ | ------ | ------ | 503 | 735 | 676 | 763 | 669 | 602 | 578 | 656 |
| Portland | 391 | 277 | 493 | 589 | 429 | 387 | 277 | 365 | 198 | 239 | 115 |
| Providence | 444 | 455 | 420 | 302 | 279 | 295 | 257 | 258 | 233 | 211 | 258 |
| Rochester | 271 | 256 | 254 | 204 | 213 | 166 | 260 | 222 | 184 | 227 | 200 |
| St. Louis | 4,020 | 5,077 | 2,335 | 3,233 | 2,689 | 2,717 | 2,223 | 1,714 | 1,554 | 1,571 | 1,438 |
| St. Paul | 290 | 308 | 335 | 186 | 137 | 112 | 108 | 101 | 97 | 67 | 55 |
| San Antonio | 1,045 | 830 | 1,167 | 703 | 577 | 381 | 685 | 1,569 | 601 | 212 | 111 |
| San Diego | 329 | 357 | 658 | 565 | 511 | 306 | 195 | 222 | 313 | 282 | 211 |
| San Francisco | 1,547 | 1,225 | 2,386 | 1,903 | 1,766 | 1,699 | 1,330 | 780 | 745 | 684 | 577 |
| Seattle | 811 | 741 | 902 | 838 | 731 | 499 | 317 | 236 | 218 | 207 | 124 |
| Syracuse | 793 | 508 | 893 | 846 | 483 | 364 | 256 | 306 | 302 | 214 | 189 |
| Toledo | 518 | 446 | 515 | 591 | 414 | 319 | 350 | 284 | 270 | 133 | 299 |
| Washington, D. C | ------ | ------ | 3,964 | 4,867 | 1,591 | 894 | 970 | 1,267 | 1,527 | 1,659 | 2,203 |

[1] Provisional.

Source: Forms PHS—688-562—FSA-PHS—Division of Venereal Disease, Office of Statistics, 8/21/51 (ML-JNH) mdp.

## Cases of Syphilis and Gonorrhea Reported to the Public Health Service by City Health Departments, Fiscal Years 1941–51—Continued

[Known military cases excluded]

| City | 1941 | 1942 | 1943 | 1944 | 1945 | 1946 | 1947 | 1948 | 1949 | 1950 | 1951 [1] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | CONGENITAL SYPHILIS | | | | | | |
| Akron | 40 | 57 | 58 | 48 | 52 | 52 | 33 | 37 | 43 | 52 | 34 |
| Atlanta | 10 | 10 | 41 | 26 | 58 | 57 | 94 | 76 | 40 | 21 | 15 |
| Baltimore | 89 | 64 | 83 | 70 | 93 | 81 | 93 | 130 | 158 | 114 | 110 |
| Birmingham | 98 | 113 | 145 | 83 | 66 | 117 | 107 | 50 | 51 | 60 | 27 |
| Boston | 78 | 80 | 80 | 56 | 62 | 57 | 55 | 43 | 33 | 29 | 18 |
| Buffalo | 48 | 48 | 71 | 46 | 45 | 30 | 37 | 32 | 27 | 19 | 20 |
| Chicago | 417 | 381 | 418 | 356 | 389 | 369 | 352 | 323 | 256 | 229 | 202 |
| Cincinnati | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 66 | 86 | 76 | 56 |
| Cleveland | 121 | 120 | 137 | 96 | 82 | 67 | 45 | 65 | 91 | 73 | 41 |
| Columbus | 60 | 63 | 62 | 46 | 51 | 46 | 30 | 41 | 40 | 25 | 50 |
| Dallas | 39 | 32 | 32 | 19 | 15 | 31 | 35 | 27 | 61 | 23 | 4 |
| Dayton | 50 | 46 | 41 | 55 | 27 | 25 | 15 | 36 | 22 | 23 | 31 |
| Denver | 74 | 60 | 54 | 53 | 50 | 23 | 23 | 25 | 16 | 22 | 11 |
| Detroit | 173 | 183 | 203 | 225 | 182 | 152 | 191 | 197 | 157 | 137 | 114 |
| Honolulu | ------ | 26 | 43 | 46 | 17 | 22 | 57 | 44 | 59 | 40 | 25 |
| Houston | 172 | 162 | 105 | 60 | 64 | 51 | 65 | 58 | 55 | 47 | 38 |
| Indianapolis | 29 | 28 | 32 | 30 | 32 | 31 | 54 | 71 | 95 | 38 | 73 |
| Jersey City | 34 | 30 | 30 | 22 | 20 | 15 | 11 | 26 | 15 | 17 | 27 |
| Kansas City | 19 | 106 | 84 | 79 | 63 | 32 | 27 | 27 | 23 | 26 | 16 |
| Los Angeles | 253 | 196 | 288 | 338 | 330 | 235 | 260 | 180 | 138 | 125 | 79 |
| Louisville | 45 | 76 | 57 | 35 | 27 | 51 | 32 | 36 | 37 | 20 | 41 |
| Memphis | 166 | 172 | 110 | 106 | 182 | 88 | 89 | 59 | 63 | 42 | 198 |
| Milwaukee | 12 | 14 | 7 | 5 | 10 | 17 | 29 | 35 | 35 | 31 | 19 |
| Minneapolis | 22 | 28 | 21 | 23 | 16 | 17 | 19 | 18 | 8 | 7 | 7 |
| Newark | 105 | 94 | 47 | 61 | 47 | 37 | 43 | 25 | 39 | 55 | 42 |
| New Orleans | 14 | 6 | ------ | ------ | 209 | 148 | 129 | 76 | 83 | 72 | 28 |
| New York | 1,040 | 1,029 | 692 | 628 | 599 | 553 | 549 | 644 | 538 | 485 | 510 |
| Oakland | 42 | 23 | 36 | 44 | 51 | 36 | 49 | 48 | 40 | 43 | 44 |
| Oklahoma City | 5 | 51 | 31 | 52 | 23 | 42 | 33 | 31 | 24 | 23 | 29 |
| Omaha | 14 | 24 | 41 | 28 | 22 | 39 | 45 | 19 | 22 | 18 | 20 |
| Philadelphia | 276 | 52 | 99 | 52 | 182 | 164 | 218 | 164 | 168 | 143 | 107 |
| Pittsburgh | ------ | ------ | ------ | 37 | 81 | 73 | 113 | 113 | 71 | 48 | 38 |
| Portland | 17 | 10 | 33 | 17 | 13 | 8 | 15 | 8 | 4 | 5 | 2 |
| Providence | 27 | 28 | 14 | 9 | 15 | 21 | 11 | 29 | 13 | 19 | 14 |
| Rochester | 11 | 6 | 11 | 8 | 7 | 10 | 14 | 14 | 7 | 11 | 9 |
| St. Louis | 229 | 299 | 132 | 199 | 203 | 235 | 232 | 148 | 80 | 93 | 132 |
| St. Paul | 16 | 8 | 18 | 14 | 15 | 6 | 12 | 5 | 4 | 5 | 6 |
| San Antonio | 190 | 203 | 59 | 35 | 43 | 57 | 95 | 127 | 59 | 46 | 59 |
| San Diego | 27 | 30 | 27 | 35 | 37 | 27 | 48 | 30 | 13 | 20 | 11 |
| San Francisco | 48 | 39 | 63 | 66 | 53 | 53 | 58 | 34 | 61 | 23 | 24 |
| Seattle | 30 | 37 | 24 | 24 | 14 | 19 | 12 | 7 | 20 | 15 | 7 |
| Syracuse | 45 | 24 | 21 | 23 | 11 | 31 | 16 | 13 | 13 | 14 | 7 |
| Toledo | 32 | 55 | 35 | 33 | 17 | 21 | 21 | 30 | 13 | 11 | 32 |
| Washington, D. C | ------ | ------ | 156 | 130 | 106 | 67 | 125 | 141 | 95 | 69 | 71 |

[1] Provisional.

Source: Forms PHS-688-562—FSA—PHS—Division of Venereal Disease, Office of Statistics, 8/21/51 (ML-JNH) mdp.

## Cases of Syphilis and Gonorrhea Reported to the Public Health Service by City Health Departments, Fiscal Years 1941–51—Continued

[Known military cases excluded]

| City | 1941 | 1942 | 1943 | 1944 | 1945 | 1946 | 1947 | 1948 | 1949 | 1950 | 1951 [1] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| GONORRHEA | | | | | | | | | | | |
| Akron | 288 | 313 | 268 | 352 | 668 | 903 | 730 | 574 | 514 | 434 | 297 |
| Atlanta | 504 | 903 | 1,031 | 1,560 | 3,090 | 4,004 | 6,953 | 6,561 | 5,747 | 6,293 | 6,690 |
| Baltimore | 2,592 | 3,022 | 3,885 | 2,588 | 3,495 | 4,189 | 4,677 | 6,480 | 5,957 | 7,072 | 6,437 |
| Birmingham | 623 | 605 | 852 | 555 | 2,066 | 3,912 | 4,510 | 2,516 | 1,033 | 753 | 670 |
| Boston | 1,170 | 1,163 | 1,223 | 1,379 | 1,545 | 1,868 | 1,996 | 1,639 | 1,944 | 1,631 | 1,306 |
| Buffalo | 717 | 611 | 993 | 917 | 1,237 | 1,778 | 892 | 588 | 882 | 739 | 793 |
| Chicago | 12,588 | 14,342 | 13,005 | 13,343 | 15,061 | 25,234 | 28,113 | 25,200 | 21,224 | 17,547 | 17,179 |
| Cincinnati | 1,549 | 1,036 | 995 | 989 | 1,274 | 1,323 | 1,179 | 1,166 | 1,345 | 1,045 | 852 |
| Cleveland | 1,482 | 1,453 | 1,397 | 1,599 | 1,918 | 2,911 | 3,417 | 3,731 | 3,694 | 3,207 | 2,829 |
| Columbus | 286 | 293 | 380 | 345 | 489 | 1,105 | 1,305 | 1,292 | 1,405 | 1,557 | 1,078 |
| Dallas | 1,761 | 1,815 | 1,091 | 795 | 904 | 1,114 | 2,209 | 2,487 | 2,667 | 2,998 | 2,862 |
| Dayton | 314 | 181 | 277 | 631 | 595 | 767 | 990 | 915 | 1,041 | 732 | 891 |
| Denver | 884 | 1,105 | 1,227 | 1,631 | 1,244 | 1,431 | 1,470 | 1,257 | 1,107 | 1,041 | 881 |
| Detroit | 4,345 | 5,025 | 5,132 | 5,782 | 5,777 | 6,876 | 6,346 | 5,243 | 4,873 | 5,619 | 5,089 |
| Honolulu | 793 | 1,044 | 1,100 | 1,120 | 625 | 334 | 521 | 549 | 593 | 418 | 313 |
| Houston | 1,487 | 1,132 | 1,282 | 2,212 | 2,349 | 3,221 | 3,334 | 4,948 | 5,582 | 4,832 | 4,797 |
| Indianapolis | 634 | 580 | 173 | 163 | 645 | 1,468 | 539 | 1,337 | 1,265 | 1,287 | 1,014 |
| Jersey City | 130 | 126 | 47 | 49 | 112 | 215 | 425 | 396 | 274 | 301 | 247 |
| Kansas City | 695 | 504 | 934 | 1,005 | 1,097 | 1,607 | 1,229 | 1,353 | 1,140 | 1,125 | 1,055 |
| Los Angeles | 5,512 | 4,426 | 4,778 | 5,276 | 7,030 | 8,602 | 11,214 | 10,216 | 9,114 | 7,146 | 6,812 |
| Louisville | 1,254 | 1,379 | 1,201 | 1,020 | 1,653 | 2,781 | 5,498 | 3,726 | 3,115 | 2,234 | 1,236 |
| Memphis | 577 | 2,883 | 3,344 | 5,146 | 6,460 | 10,407 | 13,896 | 11,941 | 11,745 | 12,387 | 10,539 |
| Milwaukee | 197 | 120 | 104 | 219 | 374 | 577 | 677 | 640 | 509 | 439 | 537 |
| Minneapolis | 508 | 718 | 666 | 764 | 1,078 | 1,224 | 829 | 858 | 587 | 555 | 457 |
| Newark | 1,045 | 1,221 | 956 | 925 | 1,330 | 1,627 | 1,979 | 2,170 | 2,062 | 1,427 | 1,718 |
| New Orleans | 685 | 1,209 | 1,464 | 1,980 | 1,693 | 3,326 | 5,297 | 5,129 | 5,566 | 4,357 | 3,558 |
| New York | 14,720 | 11,718 | 11,828 | 13,834 | 15,409 | 20,840 | 22,248 | 23,742 | 22,431 | 17,861 | 15,670 |
| Oakland | 701 | 604 | 953 | 1,519 | 2,040 | 2,411 | 3,337 | 2,807 | 2,077 | 1,754 | 1,541 |
| Oklahoma City | 298 | 623 | 815 | 1,177 | 1,273 | 2,842 | 3,577 | 3,440 | 2,600 | 2,513 | 2,126 |
| Omaha | 371 | 478 | 668 | 487 | 506 | 829 | 623 | 572 | 661 | 709 | 481 |
| Philadelphia | 324 | 617 | 146 | 1,003 | 1,278 | 3,721 | 6,498 | 8,838 | 8,661 | 8,621 | 7,947 |
| Pittsburgh | 322 | 361 | 381 | 255 | 329 | 606 | 1,128 | 968 | 1,142 | 963 | 677 |
| Portland | 626 | 409 | 593 | 1,153 | 1,652 | 1,680 | 1,293 | 935 | 638 | 484 | 449 |
| Providence | 280 | 272 | 165 | 159 | 186 | 235 | 597 | 248 | 204 | 183 | 127 |
| Rochester | 430 | 312 | 225 | 296 | 448 | 515 | 491 | 374 | 263 | 256 | 247 |
| St. Louis | 2,389 | 2,143 | 1,092 | 2,357 | 4,351 | 5,189 | 4,719 | 4,091 | 3,468 | 2,647 | 2,220 |
| St. Paul | 276 | 202 | 203 | 290 | 303 | 358 | 270 | 254 | 170 | 129 | 96 |
| San Antonio | 771 | 790 | 1,026 | 1,186 | 1,285 | 2,206 | 2,104 | 1,723 | 1,518 | 1,049 | 1,084 |
| San Diego | 1,507 | 1,001 | 677 | 1,006 | 1,146 | 1,091 | 1,143 | 979 | 816 | 618 | 464 |
| San Francisco | 2,553 | 1,887 | 2,740 | 2,227 | 3,813 | 7,310 | 5,877 | 4,807 | 3,156 | 2,287 | 1,746 |
| Seattle | 1,939 | 1,160 | 1,494 | 1,762 | 1,904 | 2,193 | 2,019 | 1,703 | 1,130 | 932 | 932 |
| Syracuse | 99 | 68 | 216 | 348 | 502 | 543 | 356 | 390 | 295 | 292 | 262 |
| Toledo | 332 | 212 | 160 | 126 | 199 | 428 | 503 | 528 | 406 | 536 | 432 |
| Washington, D. C | 3,407 | 3,830 | 3,782 | 4,234 | 5,642 | 7,948 | 12,252 | 12,518 | 16,689 | 15,231 | 12,542 |

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[1] Provisional.

Source: Forms PHS-688-562—FSA—PHS—Division of Venereal Disease, Office of Statistics, 8/21/51 (ML-JNH) mdp.

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FEDERAL SECURITY AGENCY
Public Health Service

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In order to facilitate the handling of manuscripts submitted for publication in THE JOURNAL OF VENEREAL DISEASE INFORMATION, the editor requests that copy be prepared in triplicate, typewritten, double-spaced, with liberal margins. Statistical tables and charts should be set up according to the style used in the JOURNAL, and should be presented on separate sheets, rather than within text material.

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# A Study of Cross Immunity Between Syphilis and Yaws in Treated Rabbits[1]

**Charlotte P. McLeod, Sc. D.,[2] and Harold J. Magnuson, M. D.[3]**

The points of similarity between syphilis and yaws and the immunologic relationships between their respective causative agents, *Treponema pallidum* and *Treponema pertenue*, have been reviewed by several investigators. Although epidemiologic observations suggest that yaws protects against syphilis, extremely few satisfactory cross-immunity studies have been reported (*1–3*). Experimental work in both man (*4*) and monkeys (*5*) has indicated that immunity in yaws arises more slowly and is perhaps less strong than in syphilis. Studies in man have shown that infection with syphilis affords an increased resistance to yaws (*4*), and experiments in monkeys have shown that yaws affords protection against syphilis (*5*). Cross protection recently was demonstrated between *T. pallidum* and *T. pertenue* in rabbits (*6*), and cross-immobilizing activity later was demonstrated between these two species of spirochetes (*7*).

In the present experiment, cross immunity between syphilis and yaws was studied in rabbits in which the original nfections had been terminated with penicillin therapy. It will be shown that, contrary to the results of earlier investigations in untreated animals, no significant degree of cross protection was found n treated rabbits.

## Methods

The immunizing infections with both syphilis and yaws were produced in Dutch rabbits of an inbred strain.[4] These rabbits were young male adults of approximately the same age and weight when infected. The normal animals used for controls on the challenge inoculations were also young male Dutch rabbits.[5] The rabbits were housed in animal rooms in which the temperature was maintained at below 70° F. at all times. The strains of spirochetes employed were the Nichols strain of *T. pallidum* and the YC strain of *T. pertenue*. The YC strain of yaws has been studied extensively in rabbits (*6, 8, 9*), and a transfer was kindly supplied by Dr. Thomas B. Turner.

The organisms used to produce the immunizing infections with syphilis were obtained from rabbits which had been infected 12 to 21 days earlier and showed moderate to well-developed testicular lesions. The *T. pallidum* suspension used for challenge was prepared from the testicles of rabbits having early syphilitic orchitis. These rabbits had been infected 11 days previously. The spirochetes with which the original yaws infections were produced were obtained from the testicles of rabbits with yaws infections of 29 to 36 days' duration. The testes were moderately indurated, and one or both testicles from each source rabbit showed some degree of periorchitis. The yaws suspension used for challenge was prepared from testicles showing very early periorchitis from rabbits which had been infected with *T. pertenue* 27 days previously. The specificity of lesions which developed after both the immunizing and challenging inoculations was proved by darkfield studies. The challenged rabbits were observed for 4 months, after which node transfers were made from the rabbits which failed to develop lesions. The results obtained in the transfer animals will be reported in a later paper.

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[3] Senior Surgeon, Medical Officer in Charge.

NOTE: With the assistance of Dorothy C. Huffman, medical technician.

[4] Purchased from Rockland Farms, New City, N. Y.

[5] Purchased from a single dealer in North Carolina.

The penicillin used to terminate the immunizing infections was procaine penicillin G suspended with 2 percent (w/v) aluminum monostearate. This preparation was diluted in peanut oil in order to obtain the desired doses for individual rabbits. The total therapy for each animal was 64,000 units per kilogram of body weight, given in 4 equal daily doses (*9*).

Serum was obtained for study of immobilizing activity by bleeding the rabbits from the heart on the day preceding treatment. The serum samples were stored at −20° C. until tested. The treponemal immobilization test of Nelson and Mayer (*10*) was run according to modifications previously described (*11*).

Three groups of 20 rabbits each were inoculated in both testicles with the Nichols strain of *T. pallidum.* Two groups of 30 rabbits each were inoculated similarly with the YC strain of *T. pertenue.* The total dose for each animal was approximately 5 million organisms. The development of syphilis or yaws lesions as a result of these inoculations will be described in a later report. When the three groups of syphilis rabbits had been infected for 7, 9, and 10 months, respectively, and the two groups of yaws rabbits had been infected for 7 and 9 months, respectively, the animals were bled and the infections terminated with penicillin therapy.

Approximately 6 weeks after completion of therapy, the survivors among both the syphilis and the yaws rabbits were assorted into groups of five or six each by random distribution. The animals were then challenged by intracutaneous inoculation, the challenge with *T. pertenue* being made 2 days before the challenge with *T. pallidum.* The suspensions of both organisms were carefully calibrated (*12*) to contain 5 million spirochetes per cubic centimeter. Tenfold dilutions of each suspension were made in 50-percent serum saline, so that graded doses were obtained for inoculation which ranged from $10^6$ to $10^2$ organisms in a volume of 0.2 cc.

One group of syphilis rabbits and one group of yaws rabbits were inoculated with each dose of each spirochete suspension. The animals were injected at a single site in the middle of the back jus to the right of the midline. Control rabbits were inoculated in groups of six each

**Table 1.**—***Cross immunity between syphilis and yaws in treated rabbits***

[Shown in the body of the table are the numbers of rabbits which developed symptomatic reinfection to challenge]

Rabbits challenged with syphilis

| Challenging dose | Syphilis rabbits | | Yaws rabbits | | Controls | |
|---|---|---|---|---|---|---|
| | Positive | Negative | Positive | Negative | Positive | Negativ |
| $10^6$ | 0 | 5 | 4 | 1 | -------- | -------- |
| $10^5$ | 0 | 4 | 5 | 1 | 6 | |
| $10^4$ | 0 | 4 | 3 | 3 | -------- | -------- |
| $10^3$ | 0 | 5 | 5 | 1 | -------- | -------- |
| $10^2$ | 0 | 5 | 4 | 1 | 6 | |

Rabbits challenged with yaws

| Challenging dose | Yaws rabbits | | Syphilis rabbits | | Controls | |
|---|---|---|---|---|---|---|
| | Positive | Negative | Positive | Negative | Positive | Negati |
| $10^6$ | 0 | 4 | 4 | 1 | -------- | -------- |
| $10^5$ | 0 | 6 | 1 | 3 | 5 | |
| $10^4$ | 0 | 6 | 2 | 2 | -------- | -------- |
| $10^3$ | 0 | 4 | 2 | 2 | -------- | -------- |
| $10^2$ | 0 | 4 | 1 | 4 | 4 | |

**Table 2.—*Results of immobilization tests against* Treponema pallidum *on serum from syphilis and yaws rabbits challenged with* T. pallidum**

[Serum titers expressed as 50-percent end points]

RABBITS CHALLENGED WITH 100 *T. pallidum*

| Syphilis rabbits | | | Yaws rabbits | | |
|---|---|---|---|---|---|
| Rabbit No. | Result of challenge | Serum titer | Rabbit No. | Result of challenge | Serum titer |
| 1181 | Immune | 1:2,000 | 1072 | Lesion | 1:285 |
| 1194 | do | 1:1,280 | 1224 | do | 1:680 |
| 1180 | do | 1:785 | 1218 | do | 1:290 |
| 1054 | do | 1:2,850 | 1203 | do | 1:1,260 |
| 1190 | do | 1:2,560 | 1204 | Immune | 1:530 |

RABBITS CHALLENGED WITH 1,000 *T. pallidum*

| Syphilis rabbits | | | Yaws rabbits | | |
|---|---|---|---|---|---|
| Rabbit No. | Result of challenge | Serum titer | Rabbit No. | Result of challenge | Serum titer |
| 1159 | Immune | 1:730 | 1067 | Lesion | 1:400 |
| 1167 | do | 1:560 | 1095 | do | 1:118 |
| 1059 | do | 1:560 | 1226 | do | 1:250 |
| 1170 | do | 1:420 | 1210 | do | 1:125 |
| 1187 | do | 1:980 | 1098 | do | 1:94 |
| | | | 1086 | Immune | 1:137 |

Four groups were inoculated at a single site with $10^5$ or $10^2$ organisms from the yaws or the syphilis suspension. In two other groups of controls, each rabbit was noculated with multiple graded doses ($10^6$ to $10^2$) from the yaws or the syphilis suspension. These rabbits were inoculated on the back at five sites each, in inear arrangement, just to the right of he midline. The site for each dose was otated on the backs of successive animals in both groups in order to minimize he effect of variations in susceptibility f different areas of the skin.

Table 1 shows the development of lesions in the immunized rabbits and in ontrol rabbits which were inoculated at single site and which survived for a months' observation period. Both the yphilis rabbits and the yaws rabbits howed a solid "chancre immunity" after einoculation with the homologous strain f spirochetes. The rabbits originally nfected with yaws showed little or no nmunity to syphilis, and developed lesions after reinoculation with as few as 00 syphilis spirochetes. This lack of nmunity to syphilis was not correlated ith the duration of the yaws infection before treatment or its activity at the time of treatment. Of the 28 yaws rabbits which were challenged with syphilis, 11 of 14 rabbits with infections of 7 months' duration, and 10 of 14 rabbits with infections of 9 months' duration developed syphilitic lesions. Eight of 11 rabbits with active yaws, and 13 of 17 rabbits with latent yaws at the time of therapy developed syphilitic lesions.

The rabbits originally infected with syphilis showed a low degree of immunity to yaws, although the yaws suspension used for challenge was not sufficiently virulent to produce lesions in all of the control animals injected at a single site. One control rabbit inoculated with $10^5$ *T. pertenue* and 2 control rabbits inoculated with $10^2$ *T. pertenue* failed to develop lesions. The relatively low virulence of the yaws strain was further demonstrated in the results obtained in the controls inoculated at multiple sites. While the syphilis controls developed a lesion at every site inoculated, the yaws controls, with one exception, failed to develop a lesion at the most cephalad site. One rabbit developed a lesion after inoculation with $10^5$ spirochetes in this location. The other 5 rabbits failed to develop yaws lesions at this site after inoculation with $10^6$, $10^4$, $10^3$, $10^2$, and $10^6$ organisms, respectively.

The incubation period of syphilis lesions was 10 to 28 days in control rabbits, and 10 to 31 days in the challenged rabbits. The incubation period of yaws lesions was 12 to 68 days in control rabbits, and 12 to 124 days in the challenged animals.

Immobilization tests were run against *T. pallidum* on serum from both syphilis and yaws rabbits which were challenged with *T. pallidum.* The serum samples were collected on the day preceding therapy and the reinoculations were made 6 weeks after therapy. Table 2 presents the results of both immobilization test and reinoculation in each rabbit challenged with 100 or with 1,000 syphilis spirochetes. The serum from all rabbits challenged with the same dose was tested in the same assay; therefore, the titers of syphilis and yaws rabbits are comparable. The serum from the 10 syphilis rabbits had high immobilizing titers, and all of the animals were immune to symptomatic reinfection with the homologous strain. The serum from the 11 yaws rabbits showed a substantial degree of immobilizing activity against *T. pallidum*, yet 9 rabbits developed syphilitic lesions after reinoculation with 100 or 1,000 organisms.

## Discussion

No significant degree of cross immunity between syphilis and yaws was found in rabbits in which the original infections had been terminated with penicillin therapy. These results are in striking contrast to those of Turner, McLeod, and Updyke (*6*), who demonstrated a high degree of cross immunity in rabbits which had received no therapy. The methods used in both of these studies were largely similar: Dutch rabbits were infected intratesticularly and challenged intracutaneously. Also, in both studies the yaws rabbits were infected with the same strain of *T. pertenue* (YC) and challenged with the same strain of *T. pallidum* (Nichols). From a comparison of the results in the treated and untreated yaws rabbits, it seems clear that the effect of curative therapy was to abolish or greatly reduce the protection which latent infection with yaws affords against symptomatic reinfection with syphilis. In the earlier study (*6*), untreated yaws rabbits with infections of 6 months' duration failed to develop lesions after inoculation with approximately 2 million syphilis spirochetes. In the present study in treated animals, yaws rabbits with infections of 7 to 9 months' duration developed lesions after inoculation with 100 syphilis spirochetes.

The syphilis rabbits in the present study were infected with the Nichols strain for 7 to 10 months before treatment and were afforded surprisingly little protection against yaws, in spite of the relatively low virulence of the challenging strain. On the other hand, both the syphilis and the yaws animals were solidly immune to symptomatic reinfection with the homologous organisms.

The lack of cross immunity which was demonstrated here may have been influenced by other factors in addition to curative therapy. Among these factors are a too-brief duration of infection before treatment and the character of the particular strains chosen for study. It is well known that not all strains of *T. pallidum* protect against each other, and it is possible that similar variations may occur between strains of *T. pallidum* and *T. pertenue.*

Although the strains of syphilis and yaws spirochetes employed here did not appear to be closely related in a protective sense, an immunologic relationship was demonstrated through cross immobilization tests. Serum from the yaws rabbits as well as the syphilis rabbits contained a substantial degree of immobilizing antibody against *T. pallidum.* The presence of the antibody in the serum of the yaws rabbits immediately before treatment was not correlated with immunity to reinfection when challenged with small doses of *T. pallidum* 6 weeks after treatment. The role of the immobilizing antibody in immunity to treponemal diseases is not yet clear. It appears to be a group antibody, unrelated to reagin (*10, 13*), which is most active against the homologous strain and is produced by an antigen common to different strains and species of treponemes (*7, 11*).

## Summary

In a study of cross immunity between syphilis and yaws in rabbits with infections of 7 to 10 months' duration before treatment, the following results were obtained:

1. Both syphilis rabbits and yaws rabbits failed to develop lesions upon reinoculation with the homologous strain of spirochetes.
2. Rabbits originally infected with syphilis showed a low degree of immunity to reinoculation with yaws spirochetes.
3. Rabbits originally infected with yaws showed little or no immunity to reinoculation with as few as 100 syphilis spirochetes.
4. The serum from yaws rabbits which were not immune to syphilis possessed a substantial degree of immobilizing activity against *T. pallidum*.

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# Serum Standards for Serologic Tests for Syphilis[1]

**Ad Harris; [2] Virginia L. Harding, B. S.; [3] and H. N. Bossak, B. S.[4]**

## I. Preparation of Dehydrated Serums

Serologic tests for syphilis include the use of controls to determine the activity of test components, either individually or in combination, and some technics provide for the testing of known reactive and nonreactive serums. Since the usual "positive" control serums may be of varying potency, as to titer, they are of little value in detecting any except major variations in test reactivity levels. The purpose of this article is to describe a method for preparing dehydrated human serums that will serve as regular controls for serologic tests for syphilis and act as a rule or guide for maintaining these tests at constant levels of reactivity.

### Method

Attempts to prepare satisfactory human serum controls for serologic tests for syphilis by freeze-drying methods were first unsuccessful because the reconstituted samples contained macro- or microscopically visible particles that interfered with some test readings. Several means were employed in attempts to prevent the formation of insoluble serum particles during dehydration. Results obtained are listed in table 1.

Experimental evidence showed that human serum could be freeze-dried and reconstituted without visible particle formation if the serum was diluted to, or beyond, a critical point before dehydration. Only those serums that were diluted with 3 to 4 volumes of 0.9-percent sodium chloride solution prior to freeze-drying redissolved completely in distilled water, so this method was used in preference to the others listed. During a period of approximately 2½ years, 28 lots of serum have been prepared in this manner and used as operating controls in serologic tests for syphilis. One of these lots, that had been prepared from chylous serum, was unsatisfactory for use and was discarded.

### *Preparation of Freeze-Dried Control Serums*

Blood, in 250- to 350-ml. quantities, is obtained from syphilitic donors known to have medium- or high-titered reactions, in each of a battery of tests for syphilis (preferably positive when diluted with 20 or more parts of sodium chloride solution). After clotting, serum is separated by centrifugation. If serums are to be retained several days before being processed, they are stored at —20° C.

Serums are passed through sterilizing Seitz filters on the day they are to be dehydrated and mixed with four volumes of 0.9-percent sodium chloride solution. Five-milliliter portions of these diluted serums are placed in long-necked ampules that are designed to fit the dehydrating apparatus shown in figure 1. Ampules of 10-ml. capacity are used for the processing of 5-ml. serum aliquots. These ampules are then placed in a freezing mixture of solid $CO_2$-alcohol, in a nearly horizontal position, so that the serum is frozen within one side of the ampule. Loading of the ampules onto the dehydrating apparatus is accomplished in a walk-in refrigerator with temperature set at approximately 6° C., where the loaded apparatus remains until negative tension of approximately $500\mu$ has been obtained (usually 5 to 10 minutes after pump is started). The loaded dehydrating apparatus is then moved from the refrigerator, without interrupting the operation of the vacuum pump, and allowed to remain

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**Table 1.—*Results obtained with dehydrated (freeze-dried) human serum***

| Type of sample | Reconstituted with— | Resolubility | Appearance |
|---|---|---|---|
| Seitz-filtered serum | Distilled water | Slowly resoluble | Slight opalescence. Microscopic particles. |
| Seitz-filtered serum containing 2 percent glucose | do | do | Do. |
| Neurath precipitate redissolved in Neurath buffered saline solution (*1*). | do | Rapidly resoluble | Slight turbidity. Large macroscopic particles. |
| Neurath precipitate redissolved in Neurath buffered saline solution (*1*) containing ½ percent glucose. | do | do | Do. |
| Neurath precipitate redissolved in Neurath buffered saline solution (*1*) containing 2 percent glucose. | do | do | Slight opalescence. Small macroscopic particles. |
| Cohn precipitate, fractions II and III (*2*) redissolved in 0.9-percent saline solution. | do | do | Slight turbidity. Large macroscopic particles. |
| Do | ½ percent glucose in distilled water. | do | Do. |
| Do | 2 percent glucose in distilled water. | do | Do. |
| Cohn precipitate, fractions II and III (*2*) redissolved in 0.9-percent saline solution containing ½ percent glucose. | Distilled water | Slowly resoluble | Do. |
| Cohn precipitate, fractions II and III (*2*) redissolved in 0.9-percent saline solution containing 2 percent glucose. | do | do | Do. |
| 4 parts Seitz-filtered serum+1 part 0.9-percent saline solution. | do | do | Slight opalescence. Microscopic particles. |
| 3 parts Seitz-filtered serum+2 parts 0.9-percent saline solution. | do | do | Do. |
| 2 parts Seitz-filtered serum+3 parts 0.9-percent saline solution. | do | More rapidly resoluble. | Do. |
| 1 part Seitz-filtered serum+4 parts 0.9-percent saline solution. | do | Rapidly and completely resoluble. | Clear solution. No particles. |

at room temperature. Dehydration is continued for at least 20 hours, during which time the pressure readings range downward to 10μ or less. At the end of this period, pumping is discontinued and ampules are removed from the machine. Some of these ampules have been sealed off under negative tension, and in other instances, dry air or dry nitrogen has been admitted to the apparatus before the ampules were sealed. Ampules are cut from the machine with an oxygen gas blowtorch, using care to seal the glass on both the apparatus and ampule ends.

Sealed ampules are stored for 24 hours at refrigerator temperature and examined for cracks, particularly around the sealed area of the neck. Cracked ampules are discarded. Several ampules from each lot are stored in the refrigerator at 5° to 6° C. and others are stored at 37° C. as accelerated deterioration controls. Ampules stored at both of these temperatures have been simultaneously tested at 2-week or monthly intervals, using a battery of serologic tests for syphilis. The first lots of serum so prepared were processed in Pyrex glass ampules that were sealed under negative tension. These serums were found to retain serologic reactivity, without detectable change, for periods of more than 6 months when stored at 37° C., or more than 1 year at refrigerator temperature. Detectable deterioration was noted when dehydrated serum prepared in this manner and sealed at normal tension under dry air was stored at 37° C. for 60 days. Trials have indicated that adequate preservation can be obtained in ampules sealed at normal tension under dry nitrogen. This method is now routine for the preparation of dehydrated control serums in the Venereal Disease Research Laboratory.

## Discussion

Theoretically, if reagents of standardized activity are used in identical methods for serologic tests for syphilis,

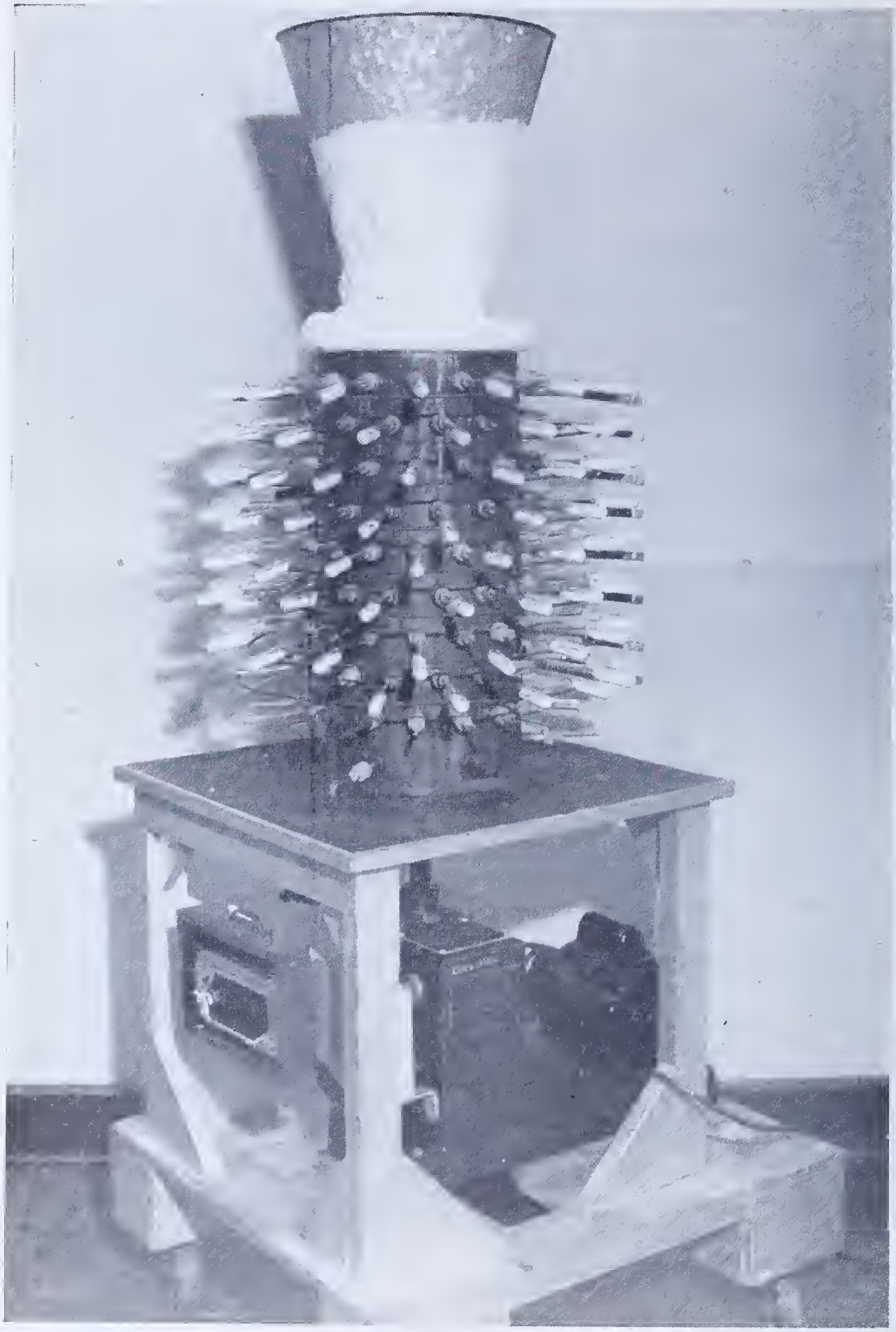

FIGURE 1.—Vandon dehydrating apparatus. (See opposite page.)

identical results would be obtained by any single method, on the same specimen, in all laboratories. This presupposes that all test reagents would be adequately standardized, that testing procedures would be accurately followed without deviation, and that reading standards would be alike in all laboratories. Unfortunately, this is not now so.

Attempts have been made to obtain greater conformity in serologic testing procedures in the major testing laboratories of this country through the efforts of the United States Public Health Service and the State laboratories. From these sources, services pertaining to the publication of laboratory manuals, distribution and check-testing of standardized serologic reagents, and the distribution of blood and serum specimens for parallel testing are made available to the many laboratories of this country. Whole blood and, in some instances, pooled, merthiolated serum samples are being used for these interlaboratory evaluation studies. Since the influence of time-temperature in transit can affect the serologic reactivity of mailed blood or serum samples, these types of specimens have not been wholly satisfactory as interlaboratory controls, although they are useful for check-testing purposes.

In studies organized at this laboratory for the purpose of evaluating serologic test performances in the major laboratories of several countries in Europe and Asia, at the request of the World Health Organization of the United Nations, it was found that specimens sent from some areas by air mail would be in transit during a period of 5 to 30 days. Under these circumstances, the use of whole blood was impractical, and the effects of relatively high temperature storage, during transit, on serum specimens were unpredictable. For this reason, investigation of means for preserving serums that would be used in interlaboratory studies, not only in this country, but throughout the world, was started. The primary consideration was that such serum samples should retain serologic activity without detectable change for at least 30 days when stored at 37° C. Merthiolate and other bacteriostats used did not prevent loss of titer under these storage conditions.

Dehydrated human serum, prepared as recorded in this article, has been found to be satisfactory as a daily operating control in this laboratory, even after storage at 37° C. for reasonably long periods of time. However, for routine use, these tubes of dried serum are stored at refrigerator temperatures. Ampules of these serums are presently being distributed to several State laboratories in quantities sufficient for daily checking or spot checking (1 ampule per week or 52 per year).

Each shipment of control serum to the State laboratories (26 ampules or a 6-month supply) is accompanied by an expiration date. This expiration date, calculated on the use of one ampule per week rather than on expected deterioration of the serum, is necessary since the periodic testing of retention aliquots of each such serum in the distributing laboratory is not performed for a period longer than 6 months.

The 5.0-ml. quantity of rehydrated serum in each ampule is more than is needed for the control of a single testing

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FIGURE 1.—This drier is composed of an inner and outer metal unit and a rubber gasket used at the top-rim junction of these units. The inner receptacle serves as a container for the solid $CO_2$-alcohol mixture and moisture from the materials being dehydrated collects on the outer surface of this part. The outer metal shell may be fabricated with the desired number of ports or outlets (the machine illustrated has 146 side outlets) and has a single, larger outlet at the center bottom for connection to the pump. A galvanized metal funnel has been inserted into the top of the inner chamber so that a larger amount of solid $CO_2$ may be placed in the receptacle during the overnight dehydration period of operation. Metal rings, held on by removable metal arms, act as supports for the serum ampules. This apparatus, with rubber gasket, was obtained from The Vandon Co., 157 Van Winkle Ave., Hawthorne, N. J.

Rubber cannulas, for connecting the glass ampules to metal outlets, were obtained from The West Co., Phoenixville, Pa.

A Cenco-Megavac vacuum pump and McLeod gage complete the dehydrating apparatus assembly. The wooden platform dolly that was constructed locally is approximately 3 feet square at the base and has four wheels so that the entire assembly may be moved into a walk-in refrigerator for loading and brought out to room temperature for the completion of the dehydration cycle.

procedure. It has been found that aliquots of this rehydrated serum control, sufficient for 1 day's testing, may be preserved by storage in the frozen state, if properly stoppered, for not more than 5 days. One tube of control serum may, in this way, be used as test controls for the 5 testing days of 1 week, if 0.5-ml. aliquots are sufficient.

It is essential that a low pressure (50$\mu$ or less) be rapidly obtained, in the dehydrating apparatus, and maintained during the drying period, if control serums of good keeping quality and good resolubility are to be obtained. The machine pictured in this article has been more efficient in this regard than other models used. Residual moisture content of serums processed as herein described has been approximately 0.4 percent.

## II. Use of Dehydrated Human Serums as Test Controls

Dehydrated human serums, prepared as reported in part I of this paper, have been used as daily controls in serologic tests for syphilis at the Venereal Disease Research Laboratory for several years. These serums also are being distributed to State laboratories as guides for maintaining constant levels of reactivity in routine serologic tests performed daily and for determining the relative reactivity levels of the tests performed in the Venereal Disease Research Laboratory and in other laboratories.

The purpose of this paper is to describe in detail the manner in which this dehydrated control serum is used in the testing laboratory and the contribution it can make as a laboratory control. Dehydrated control serum will assist laboratories that perform serologic tests for syphilis in obtaining a common plateau of reactivity for these procedures and in reducing daily test fluctuations to a minimum.

### Method

Each lot of dehydrated control serum is stored at refrigerator temperature (3° to 6° C.) until sent to the testing laboratory. Some tubes from each lot also are stored at 37° C. to serve as accelerated deterioration controls.

Tests are performed at least five times on each lot of control serum before it is released to the testing laboratory. A composite of these results is then recorded on a reference sheet that is identified by the number of the serum-lot tested.

Preparation and testing of this dehydrated serum in the control laboratory is accomplished in the manner listed on the instruction sheet sent with the serum to the testing laboratory. This instruction sheet is shown in figure 2.

A reference sheet showing the reactivity of the designated control serum in each of the several serologic tests for syphilis accompanies each shipment of control serum. An example is shown in figure 3.

Each of the serologic tests for syphilis being performed in this laboratory is considered to be satisfactory when the tested controls react as designated. Testing procedures are carried out in strict accordance with the technic outlines published in the Manual of Serologic Tests for Syphilis, 1949 (*3*), or in other specified publications.

### Discussion

The dehydrated control serum herein referred to is not recommended as a substitute for any of the "controls" designated for a specific testing procedure. It is not intended that this type of control be used to evade or circumvent restrictions contained in testing technics.

Failure to obtain the designated reactions with these control serums in a specific testing procedure indicates that there are differences in this particular test as performed in the two laboratories. These differences may lie in the antigen or other reagents used, the method of performing the test, or the manner of reading and/or reporting results. Behavior of the serum controls serves only to indicate that the tests are operating at similar or dissimilar levels in the two laboratories and does not necessarily indicate the causative factors for any differences noted.

The relative reactivity levels of several different kinds of tests with a single control serum are not necessarily indicative of the relative sensitivity or specificity of these tests. Tests of medium or lower reactivity may react to a greater degree with a single serum than do the tests that are statistically more sensitive. Therefore, results obtained with the control serums should be used in judging only the performances of identical procedures in the two laboratories, i. e., Kolmer against Kolmer, Kahn against Kahn, etc., and not for weighing the sensitivities of dissimilar tests such as Eagle against Kline, or Mazzini against VDRL tests.

When any of the serologic tests for syphilis performed in the Venereal Disease Research Laboratory fail to give the prescribed reactions with the control serum dilutions, the test in question is halted until the reason for these discrepancies is ascertained. The reactivity of antigen emulsions for most of the flocculation tests can be predetermined by testing control serums before the test is started: when an increased or lowered activity of the antigen emulsion is noted, corrective measures may be instituted prior to the routine operation of the test.

Some tests are constructed so that the testing of the control serum must be accomplished at the same time that the other specimens are being tested. Failure to obtain stipulated reactions in the control serum dilutions, under these circumstances, would be justification for retesting all specimens. The overnight complement-fixation test is an example.

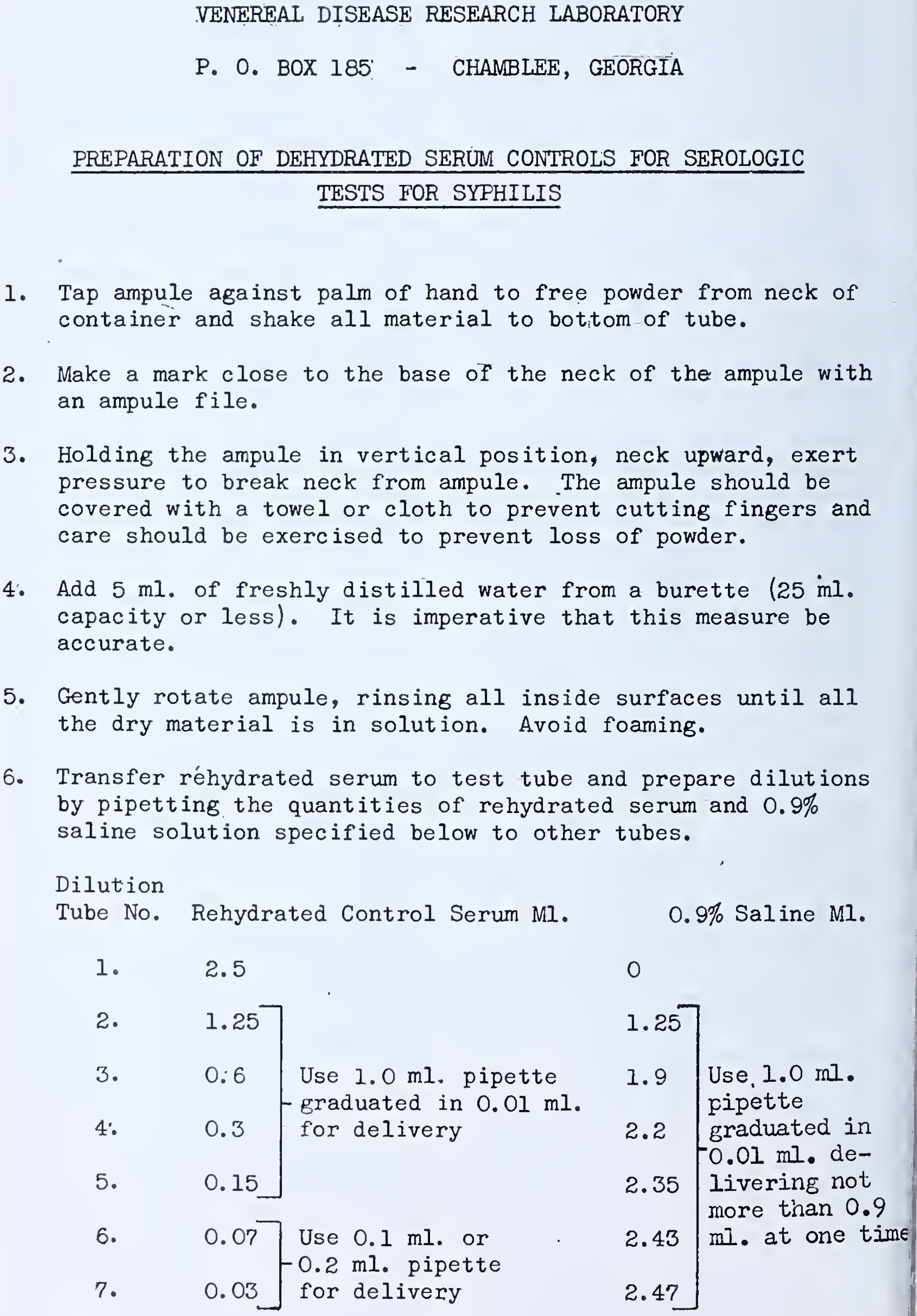
If a complement-fixation test technic specifies that tests should not be read earlier than "10 minutes after antigen control tubes are hemolyzed," the test should not be altered in this regard even though the control serums indicate that the test lacks sensitivity. The antigen or other test reagents may be the cause of this lowered sensitivity. However, if a secondary incubation period is not definite, such as in the Kolmer test which allows up to 1 hour, then a reading time for the test that will give a prescribed degree of reactivity in the control serum tubes may be selected, as long as it falls within the maximum and minimum time boundaries.

Serums, dehydrated as herein described, have retained the serologic picture of the original untreated serum in a battery of serologic tests for syphilis. Only those serums found to react in all tests used, to at least three dilutions (1 : 5, 1 : 10, and 1 : 20), have been selected for this purpose. Atypically reactive serums, however, are being dehydrated to establish a reserve of material that may be used for differential testing of new antigens or procedures.

"Falsely positive" serums preserved in this manner would be of value for determining the relative specificity of new antigens that may be proposed for serologic tests for syphilis. The keeping quality of such atypical serums may not be identical with those that have so far been studied. However, the only indication that some serums may not lend themselves to this type of dehydration has come from one lot of serum that was obviously chylous or milky before being processed. This serum failed to be completely resoluble in distilled water and was eliminated as a control serum.

Serums of graded reactivity, prepared by mixing positive and negative serums and preserved by freezing at low temperature, also may be used as controls for serologic tests for syphilis. Control serums prepared in this manner have been found to retain serologic activity for several months when stored at —20° C. if properly sealed. This type of control serum has been successfully used at the Venereal Disease Research Laboratory for many years under the restriction that storage be limited to 60 days, since some serums showed changes during longer storage periods. The advantage of a dehydrated serum control over the frozen serum is twofold. First, the dehydrated serum can be stored at low temperatures for longer periods without detectable change and, secondly, the dehydrated serum is not affected by limited exposure to the relatively high temperatures that may be experienced in transit between laboratories.

A dehydrated control serum has a limited capacity in determining the relative efficiency of testing procedures within different laboratories, if it is distributed for testing without a record of test titers,



VENEREAL DISEASE RESEARCH LABORATORY

P. O. BOX 185 - CHAMBLEE, GEORGIA

## PREPARATION OF DEHYDRATED SERUM CONTROLS FOR SEROLOGIC TESTS FOR SYPHILIS

1. Tap ampule against palm of hand to free powder from neck of container and shake all material to bottom of tube.

2. Make a mark close to the base of the neck of the ampule with an ampule file.

3. Holding the ampule in vertical position, neck upward, exert pressure to break neck from ampule. The ampule should be covered with a towel or cloth to prevent cutting fingers and care should be exercised to prevent loss of powder.

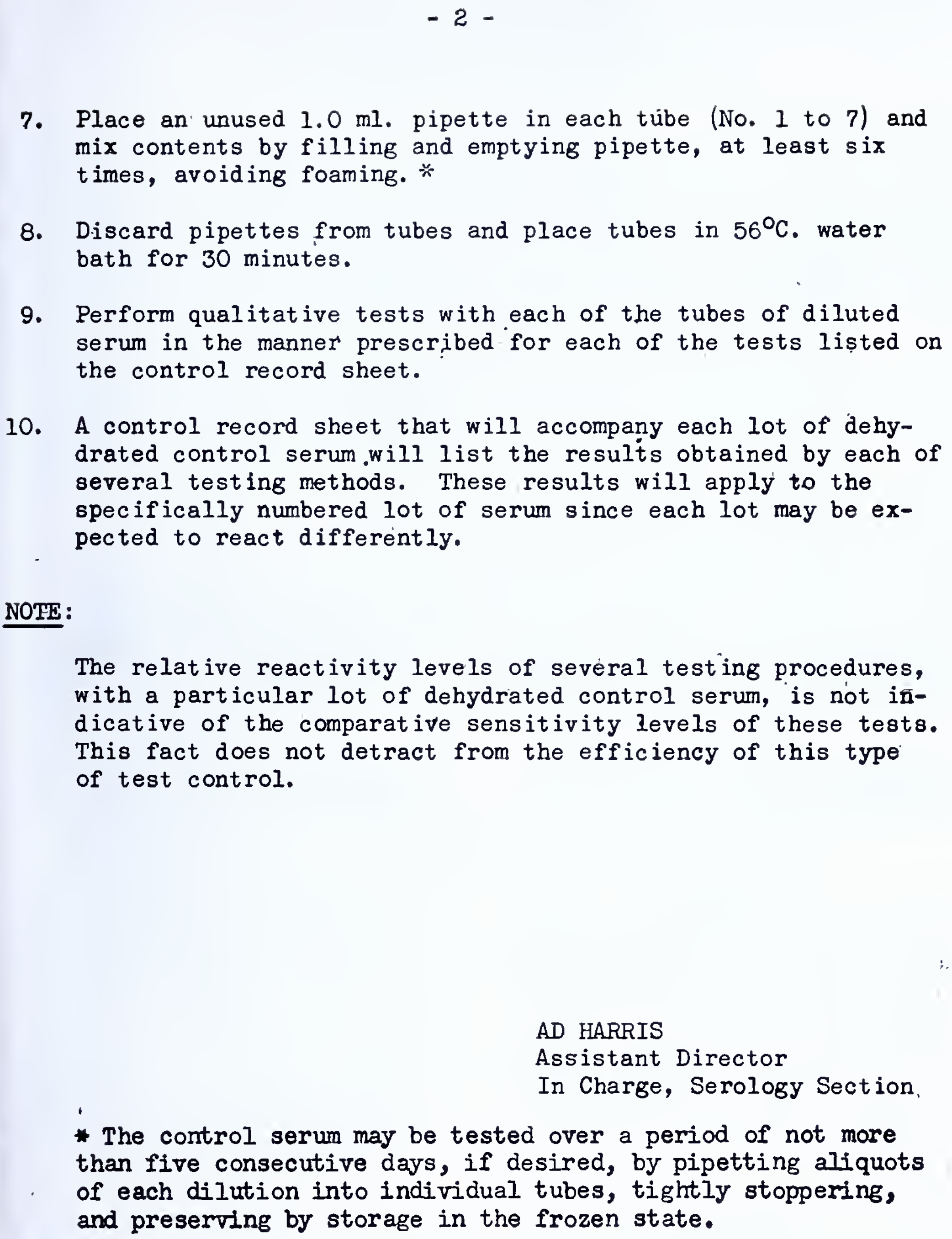
4. Add 5 ml. of freshly distilled water from a burette (25 ml. capacity or less). It is imperative that this measure be accurate.

5. Gently rotate ampule, rinsing all inside surfaces until all the dry material is in solution. Avoid foaming.

6. Transfer rehydrated serum to test tube and prepare dilutions by pipetting the quantities of rehydrated serum and 0.9% saline solution specified below to other tubes.

| Dilution Tube No. | Rehydrated Control Serum Ml. | | 0.9% Saline Ml. | |
|---|---|---|---|---|
| 1. | 2.5 | | 0 | |
| 2. | 1.25 | Use 1.0 ml. pipette graduated in 0.01 ml. for delivery | 1.25 | Use 1.0 ml. pipette graduated in 0.01 ml. delivering not more than 0.9 ml. at one time |
| 3. | 0.6 | | 1.9 | |
| 4. | 0.3 | | 2.2 | |
| 5. | 0.15 | | 2.35 | |
| 6. | 0.07 | Use 0.1 ml. or 0.2 ml. pipette for delivery | 2.43 | |
| 7. | 0.03 | | 2.47 | |

FIGURE 2.



- 2 -

7. Place an unused 1.0 ml. pipette in each tube (No. 1 to 7) and mix contents by filling and emptying pipette, at least six times, avoiding foaming. *

8. Discard pipettes from tubes and place tubes in 56°C. water bath for 30 minutes.

9. Perform qualitative tests with each of the tubes of diluted serum in the manner prescribed for each of the tests listed on the control record sheet.

10. A control record sheet that will accompany each lot of dehydrated control serum will list the results obtained by each of several testing methods. These results will apply to the specifically numbered lot of serum since each lot may be expected to react differently.

NOTE:

The relative reactivity levels of several testing procedures, with a particular lot of dehydrated control serum, is not indicative of the comparative sensitivity levels of these tests. This fact does not detract from the efficiency of this type of test control.

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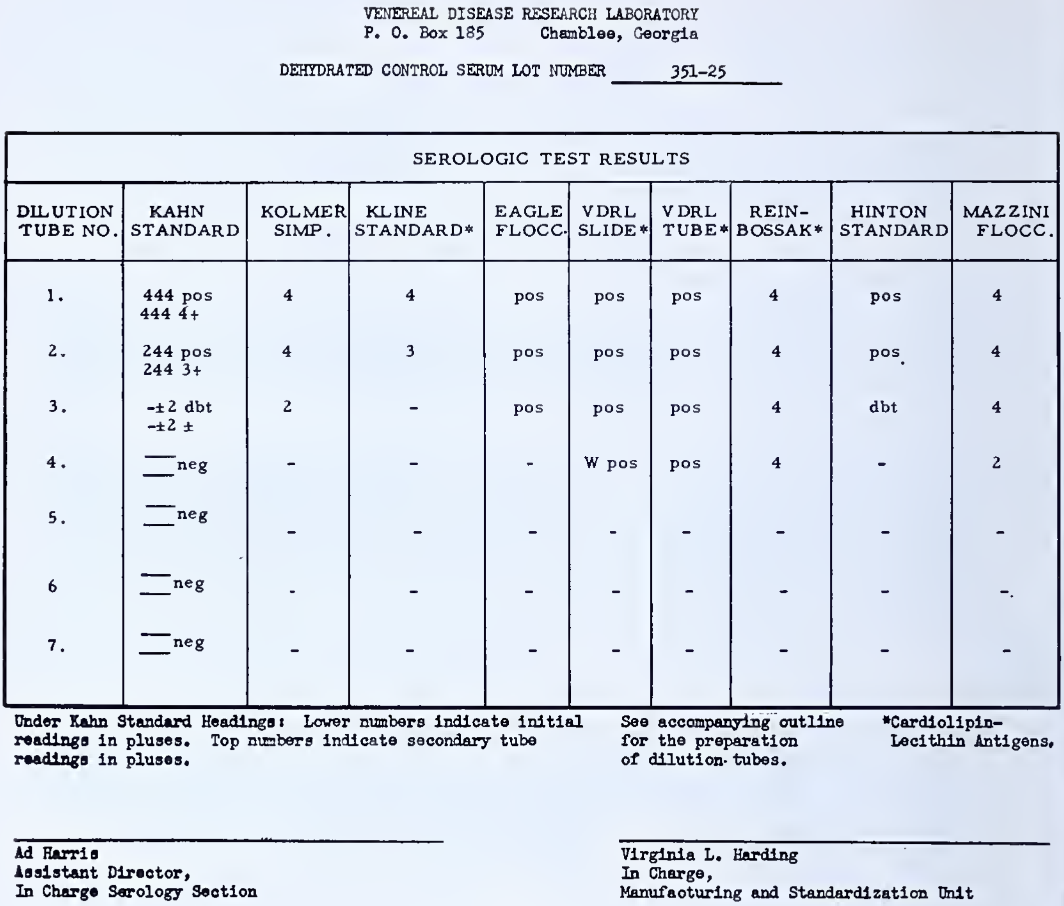
* The control serum may be tested over a period of not more than five consecutive days, if desired, by pipetting aliquots of each dilution into individual tubes, tightly stoppering, and preserving by storage in the frozen state.

FIGURE 2.—Continued.

as are whole blood specimens during the National Serologic Evaluation Studies. Any such single serum would not serve this purpose as effectively as would a selected group of blood specimens. However, a dehydrated serum control when distributed with a record of test reactivity will serve as a daily guide for maintaining testing procedures at constant levels of reactivity. So, although the dehydrated serum controls will not serve as an adequate substitute for whole bloods in some studies, neither would the whole-blood specimens supply the information necessary to accurate daily control of serologic test operations. Whole-blood specimens and dehydrated serums each have a part to play in the control and evaluation of serologic tests for syphilis.



VENEREAL DISEASE RESEARCH LABORATORY
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DEHYDRATED CONTROL SERUM LOT NUMBER 351-25

| SEROLOGIC TEST RESULTS | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| DILUTION TUBE NO. | KAHN STANDARD | KOLMER SIMP. | KLINE STANDARD* | EAGLE FLOCC. | VDRL SLIDE* | VDRL TUBE* | REIN-BOSSAK* | HINTON STANDARD | MAZZINI FLOCC. |
| 1. | 444 pos<br>444 4+ | 4 | 4 | pos | pos | pos | 4 | pos | 4 |
| 2. | 244 pos<br>244 3+ | 4 | 3 | pos | pos | pos | 4 | pos | 4 |
| 3. | -±2 dbt<br>-±2 ± | 2 | - | pos | pos | pos | 4 | dbt | 4 |
| 4. | —<br>— neg | - | - | - | W pos | pos | 4 | - | 2 |
| 5. | —<br>— neg | - | - | - | - | - | - | - | - |
| 6 | —<br>— neg | - | - | - | - | - | - | - | - |
| 7. | —<br>— neg | - | - | - | - | - | - | - | - |

Under Kahn Standard Headings: Lower numbers indicate initial readings in pluses. Top numbers indicate secondary tube readings in pluses.

See accompanying outline for the preparation of dilution tubes.

*Cardiolipin-Lecithin Antigens.

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Assistant Director,
In Charge Serology Section

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Manufacturing and Standardization Unit

FIGURE 3.

## Summary

1. A means for preparing dehydrated human serums that may be used as controls for serologic tests for syphilis is described.

2. The use of dehydrated control serums in the serologic testing laboratory is described.

3. The capacities and limitations of control serums in serologic tests for syphilis are discussed.

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# A Demonstration of the Stability of Dehydrated Serum and Suggestions for Its Use[1]

George R. Cannefax, B. S.[2]

This article concerns the maintenance of reactivity of a single lot of stabilized serum during a testing period of 15 months. Forty-nine laboratories, including the author serologists of the most widely used tests, have participated in the study. The objective of the evaluation has been to determine stability and potential usefulness of stabilized serum.

## Materials

The preparation of dry, stabilized serum used in this study has been previously described (*1*). For this study, a sufficient amount of serum was processed in 20-ml. all-glass ampules so that, on reconstitution to 20 ml. with 0.85-percent saline, the resulting serum dilution would yield a positive qualitative test with the commonly used serologic tests for syphilis and a low titer when quantitated. A serum dilution containing a small amount of reactive substance appeared to be indicated for this study since any instability resulting in small losses of reactivity would readily become apparent. The serum was further diluted 1:8 with 0.85-percent saline for use with colloidal tests and total protein determinations.

Four hundred all-glass ampules of serum were lyophilized and the serum further dried in a vacuum desiccator over phosphorus pentoxide. The ampules were sealed under vacuum, checked for leaks in the glass seal, using a Tesla coil, and stored at room temperature.

## Methods

A letter and a reprint of the article (*1*) concerning stable serum were sent to 56 laboratories: each State laboratory; the laboratories of the District of Columbia, Alaska, the Army Medical Center, and the Naval Medical Center; and the authors of the commonly used serologic tests for syphilis. The letter requested each serologist to participate in an evaluation of the stabilized serum to determine if the maintenance of reactivity for at least 1 year, as found in this laboratory, could be confirmed or refuted. Fifty-one laboratories replied favorably, and only two failed to participate throughout the testing period.

Each laboratory received one 20-ml. ampule of dehydrated stabilized serum every 3 months, starting with January 1950 and ending January 1951, a total of five ampules during the testing period.

Each serologist was asked to reconstitute the serum in each ampule to 20 ml. with 0.85-percent saline and to apportion sufficient amounts for 1 day's testing into individual test tubes. All tubes were to be frozen and one tube thawed and tested each day the serologist wished to include the serum in the daily run of tests. No request was made for each laboratory to test and report in a uniform manner. The request was made that testing be held to the same technic and the results reported in the same manner for each ampule.

## Results

The following tests were used in the various laboratories during the evaluation: Eagle flocculation and comple-

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Acknowledgments: The author is indebted and grateful to all whose cumulative efforts have made this report possible: the serologists who so freely and generously gave their time and effort; the Office of Statistics, Division of Venereal Disease, U. S. Public Health Service, which provided an excellent analysis of the data and prepared the tables and figures; and to many clinicians who have offered suggestions.

ment-fixation, Hinton, Kahn, Kolmer, Kline, Mazzini, Rein-Bossak, VDRL slide test, and the tests designed by the Nebraska and New York State laboratories and the Wisconsin Psychiatric Institute. The results of the Kahn, Kline, Kolmer, Mazzini, and VDRL slide test have been fully analyzed. The other serologic tests were not completely analyzed because of a paucity of data.

There was a noticeable daily variation of test sensitivity in certain laboratories. Therefore, it was decided that the most fair and accurate way to evaluate serum stability would be by classifying laboratories according to apparent average level of sensitivity and analyzing[3] each group according to average results. This method of analysis compensates for daily fluctuations of test sensitivity within given laboratories, yet it demonstrates actual loss in serum reactivity when tests extend over long periods. The averages would show a downward trend if there was an actual loss of reactivity. Table 1 shows the levels of sensitivity and number of laboratories reporting quantitative results at each level.

The Kahn test was the only test analyzed as a qualitative test. Reports of qualitative testing were based on the degree of flocculation obtained, without further dilution of the serum, according to 3-tube and 6-tube readings. When the results of testing obtained with the 3-tube reading alone were used as a basis for classification: 4 laboratories reported at the 2+ sensitivity level; 13, at the 3+ level; and 1 classified at the 4+ level of sensitivity.

The usual unit or dilution system of reporting quantitative tests did not lend itself well to a statistical analysis of average results. For this type of analysis it appeared advantageous to convert units or dilutions to an arithmetic progression. The dilution factor of 2, common to all the quantitative test procedures, was used in producing the arithmetic progression. The converted unit values represent the number of times 2 must be multiplied by itself to obtain the value of the usual unit or dilution system of reporting quantitative results.

Average results of quantitative Mazzini tests (average converted dilutions) obtained with tests performed during the first 10 days after each of the five ampules were reconstituted to 20 ml. are shown in table 2 and figure 1. Each point on the chart or figure in the table represents the average results obtained by the laboratories included in a given level of sensitivity. For example, the results of the first day's testing in the six laboratories of the 4 quantitative Mazzini dilution (QMD) level were not all 4 QMD. When the results of the six laboratories

**Table 1.—*Levels of sensitivity and number of laboratories reporting at each level***

| Test | Sensitivity level (dilutions) [1] | | | |
|---|---|---|---|---|
| | 1 | 2 | 4 | 8 |
| Kahn | 1 | 9 | 4 | 0 |
| Kolmer | 3 | 6 | 7 | 2 |
| Kline | 0 | 6 | 0 | 0 |
| Mazzini | 0 | 4 | 6 | 0 |
| VDRL slide test | 2 | 8 | 2 | 0 |

[1] The figures in columns 1, 2, 4, 8 indicate the number of laboratories reporting at each level of sensitivity.

**Table 2.—*Results of Mazzini quantitative tests (average converted dilutions) obtained in tests performed within 10 days after each ampule was opened, by laboratory group*** [1]

| Day of testing, all ampules | Test results [2] | |
|---|---|---|
| | Group 2 QMD | Group 4 QMD |
| 1 | 1.24 | 1.88 |
| 2 | 1.30 | 2.07 |
| 3 | 1.40 | 2.07 |
| 4 | 1.11 | 1.91 |
| 5 | 1.50 | 2.00 |
| 6 | 1.00 | 2.25 |
| 7 | 1.00 | 2.00 |
| 8 | 1.17 | 2.00 |
| 9 | 1.11 | 1.80 |
| 10 | 1.18 | 2.50 |

[1] Laboratory group based on level of performance during first 10 days' testing.

[2] Test results, 2 and 4 quantitative Mazzini dilutions, are equivalent to 1 and 2 converted dilutions, respectively.

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[3] Analysis was based on testing done during the first 10 days after each ampule was reconstituted.

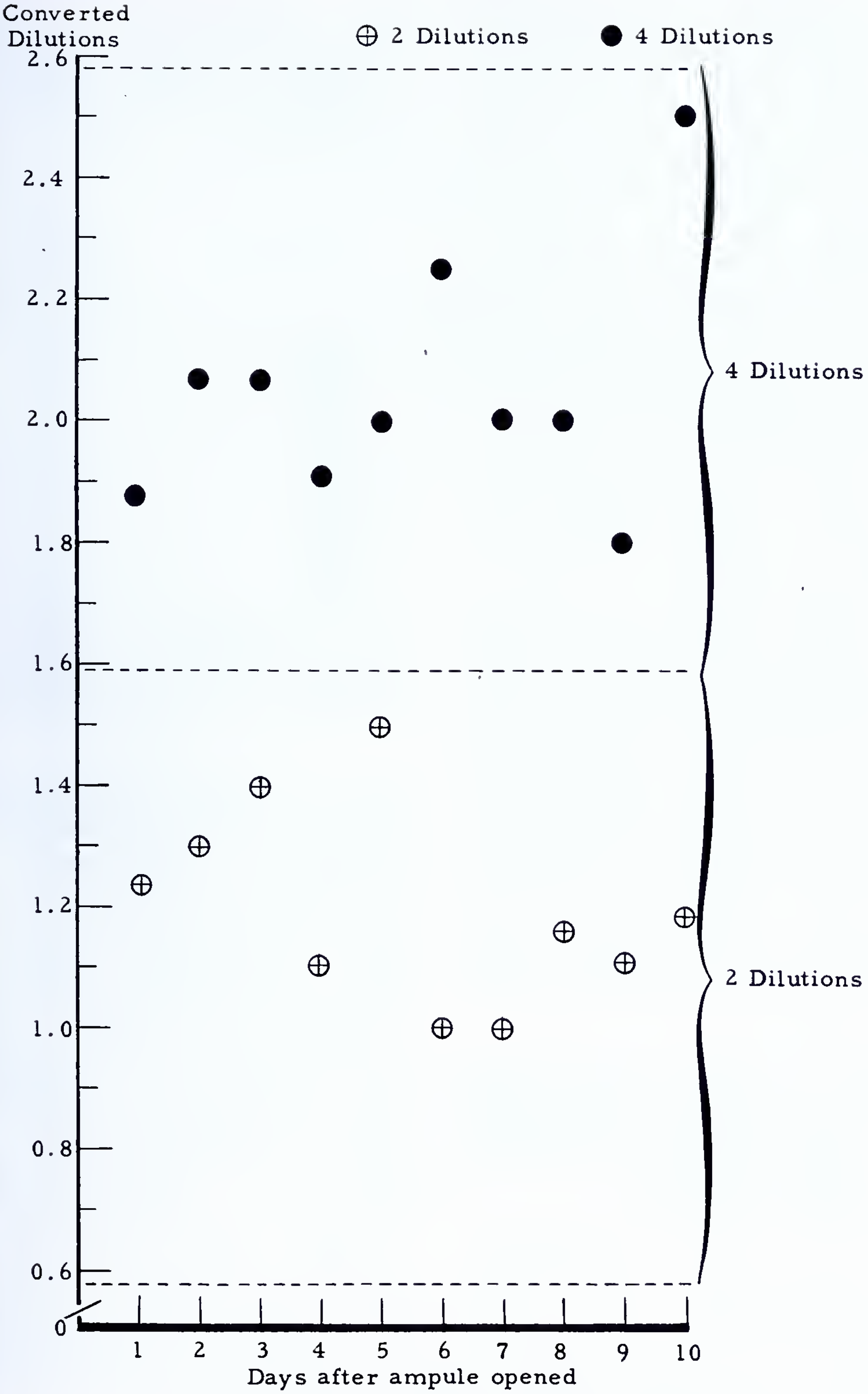

FIGURE 1.—Quantitative Mazzini tests (average converted dilutions) obtained during the first 10 days after the ampule was reconstituted to 20 ml.

were averaged and converted to dilutions of arithmetic progression, it is seen that the average result was 1.88. The range of average results during the 10-day testing period was 1.80 to 2.50 with this group, and 1.00 to 1.50 with the 2 QMD group. These values, when converted to round numbers in the usual dilution system of reporting are 2-3 and 3-6 QMD for the 2 and 4 QMD groups respectively.

Table 3 and figure 2 show the average results of testing, in successive 10-day periods, after each ampule was opened. The laboratories were classified according to average sensitivity based on the average results obtained during the first 10 days' testing. These findings are similar to those in table 2 and figure 1 and indicate the serum maintained its reactivity during these periods of testing with the Mazzini test.

In order to test the effect of deterioration after each ampule was reconstituted and deterioration over the 15-month testing period upon the stability of the serum, average results of tests performed during the first 10 days on the first ampule were compared with results of tests performed 11 to 20 days after the second ampule was opened, 21 to 30 days for the third ampule, 31 to 40 days for the fourth ampule, and 41 to 50 days for the fifth ampule. Since the average converted dilutions resulting from this procedure produced no consistent downward pattern when plotted against the results of tests performed during the first 10 days for each ampule (table 4, fig. 3), it would seem that the dehydrated serum maintains its stability for 15 months under the variable conditions of storage at room temperature without a detectable loss of reactivity, and that the reconstituted serum, stored in the frozen state, maintains its reactivity for 50 days. Fifteen months and 50 days were the limits of this evaluation and do not necessarily indicate the absolute limits of storage, in either instance, before a loss of reactivity is detectable.

Complete analysis[4] of the results of testing with the Kahn, Kline, Kolmer, and VDRL slide test showed essentially the same results as did the Mazzini test in the maintenance of stability in the processed serum.

**Table 3.**—***Results of Mazzini quantitative tests (average converted dilutions) obtained in tests performed during 10-day intervals through 50 days after each ampule was opened, by laboratory group*** [1]

| Day of testing, all ampules | Test results [2] | |
|---|---|---|
| | Group 2 QMD | Group 4 QMD |
| 1–10 | 1.20 | 2.00 |
| 11–20 | 1.03 | 2.31 |
| 21–30 | .82 | 2.18 |
| 31–40 | .93 | 2.28 |
| 41–50 | 1.11 | 1.75 |

[1] Laboratory group based on level of performance during first 10 days' testing.
[2] Test results, 2 and 4 quantitative Mazzini dilutions, are equivalent to 1 and 2 converted dilutions, respectively.

**Table 4.**—***Results of Mazzini quantitative tests (average converted dilutions) obtained during first 10 days' testing in each ampule compared with testing during successive 10-day periods in successive ampules, by laboratory group*** [1]

| Day of testing | Test results [2] | |
|---|---|---|
| | Group 2 QMD | Group 4 QMD |
| A. 1–10 days' testing: | | |
| Ampule 1 | 1.06 | 1.71 |
| Ampule 2 | 1.16 | 1.80 |
| Ampule 3 | 1.17 | 2.14 |
| Ampule 4 | 1.38 | 1.92 |
| Ampule 5 | 1.19 | 2.38 |
| B. 1–10 days: | | |
| Ampule 1 | 1.06 | 1.71 |
| 11–20 days: | | |
| Ampule 2 | 1.00 | 2.00 |
| 21–30 days: | | |
| Ampule 3 | .78 | 1.86 |
| 31–40 days: | | |
| Ampule 4 | 1.00 | 2.00 |
| 41–50 days: | | |
| Ampule 5 | 1.00 | 1.33 |

[1] Laboratory group based on level of performance during first 10 days' testing.
[2] Test results, 2 and 4 quantitative Mazzini dilutions, are equivalent to 1 and 2 converted dilutions, respectively.

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[4] The inclusion in this article of the 36 tables and 36 figures prepared for the complete analysis does not seem advisable; however, a complete set of tables and figures may be obtained by writing to the author.

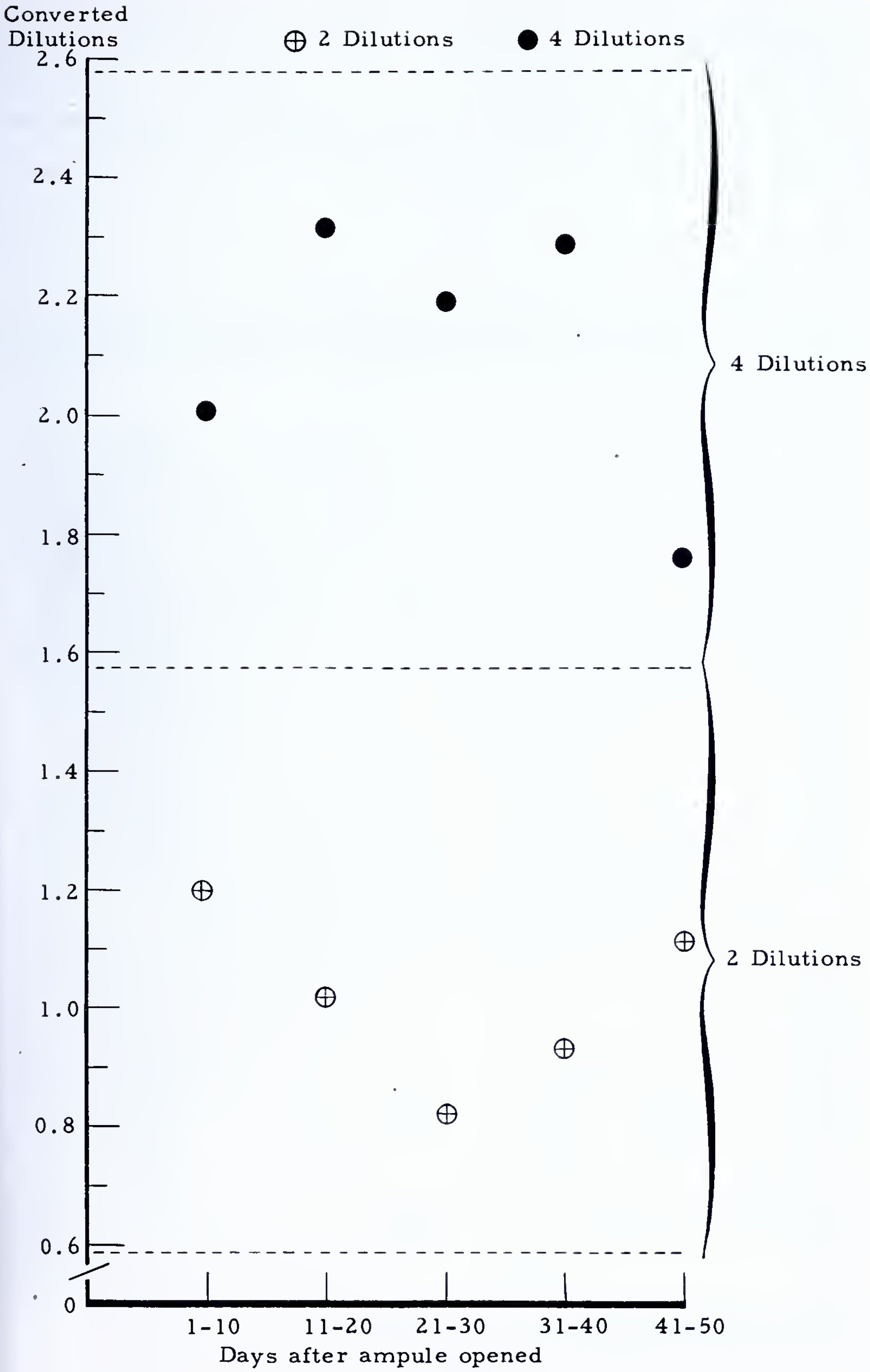

FIGURE 2.—Quantitative Mazzini tests (average converted dilutions) obtained during 10-day intervals through 50 days after each ampule was reconstituted to 20 ml.

Sixteen laboratories reported quantitative protein results. The serum after reconstitution to 20 ml. was further diluted 1:8 with 0.85-percent saline for testing. Micro-Kjeldahl analysis of the serum at this dilution produced a value of 30 mg. percent total protein. The laboratories were classified according to average level of reporting into three groups: 10-19, 20-29, and 30-39 mg. per-cent. The analysis of average results with each group showed the serum to remain stable for use with the total protein test for a minimum of 15 months

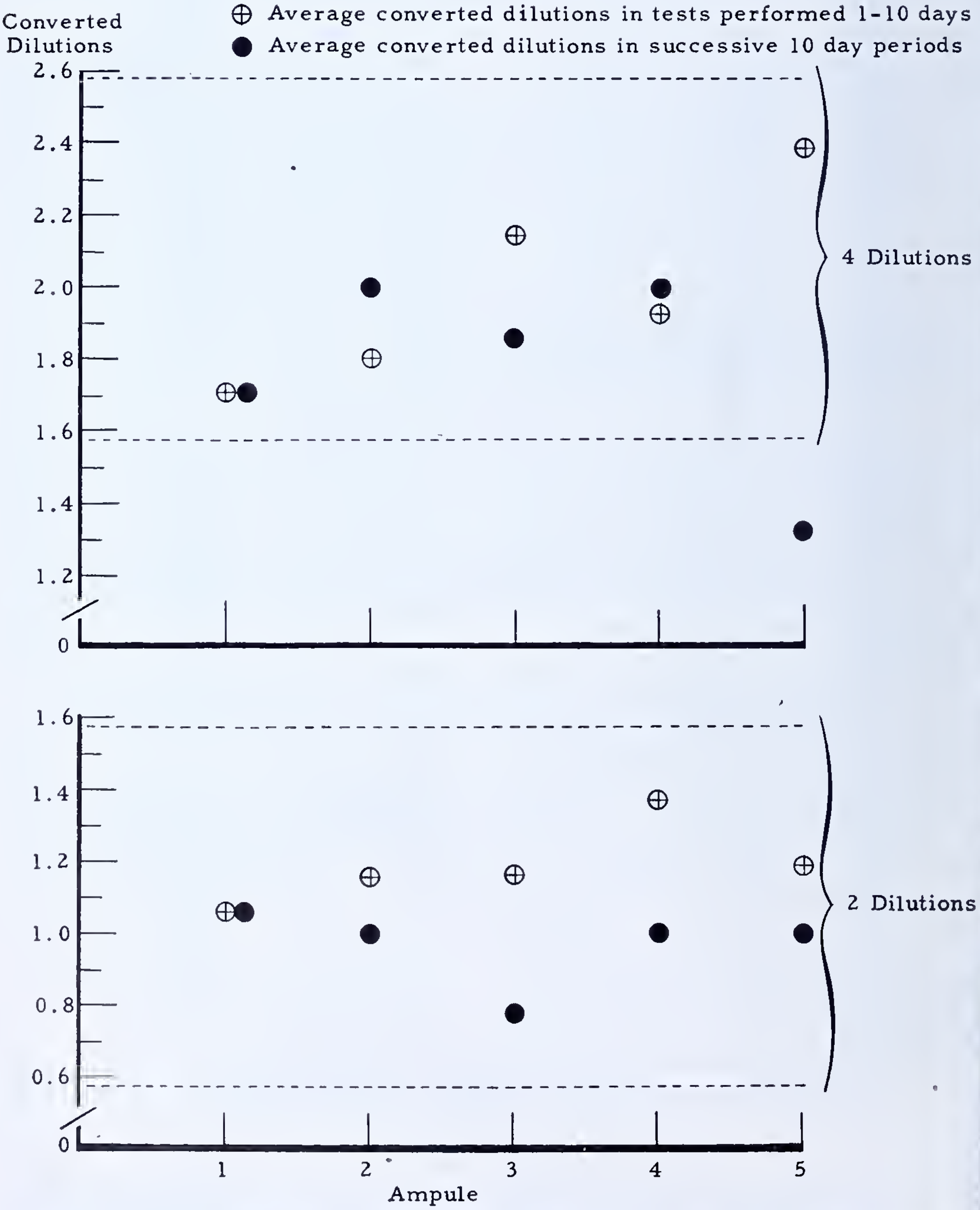

FIGURE 3.—Quantitative Mazzini tests obtained during first 10 days after reconstitution and during successive 10-day periods (average converted dilutions).

in the dehydrated state and 50 days after reconstitution when stored in the frozen state.

Several laboratories performed colloidal mastic or colloidal gold tests. The usual method of reporting these tests did not lend itself well to a statistical analysis, and no attempt was made to perform such an analysis. However, there was an obvious variation of test sensitivity among laboratories and within a given laboratory. This appeared to be much greater than the variations observed with the serologic or total protein tests.

The only unfavorable aspects of the serum were a consistent doubtful reactivity with the Hinton test and a few anticomplementary reactions in the Kolmer test in certain laboratories. Two of the more than 250 ampules used in the evaluation were reported not completely resoluble. This insolubility is attributed to cracks in the glass seals which admitted atmospheric moisture and oxygen during storage.

## Discussion

The general use of dehydrated serum with serologic tests for syphilis, for control or evaluation purposes, has been slow in developing for several reasons. Foremost, perhaps, is the lack of confidence among serologists of the maintenance of reactivity of such serum during long periods of storage. Another factor may be the unfortunate experience some serologists have had with experimental dehydrated serum that was not completely resoluble. Still another factor may be an aversion to the use of anything except whole-blood specimens or fresh serum. Of course, the unavailability of stable dehydrated serum has been a deterrent to the general use of serum of this type. The maintenance of reactivity and complete resolubility found in this evaluation appears to overcome the first two deterrents to the general use of dehydrated serum.

Dehydrated stable serum appears to be useful in two aspects of serologic testing. Such serum may be used to control or maintain the sensitivity of tests performed daily. The use of standard or approved antigens and other reagents does not completely assure test sensitivity to be at the same level as that of the author serologist. The reagents may not be used, or the results may not be interpreted and reported in the same manner as does the author serologist. The inclusion of a serum of certified reactivity into the test controls, coupled with the use of standard or approved antigens and other reagents, would more nearly assure similar and more constant levels of test sensitivity, in a given laboratory or among laboratories, in relation to the sensitivity as established by the author serologist. For use as a control serum, it appears that the author serologists would be the logical ones to certify dehydrated serum to possess a definite reactivity, in much the same manner as they now certify antigens and other reagents, and to include the manner in which control serum should be used in future descriptions of their tests.

The use of dehydrated serum, of certified reactivity, with approved antigens and other reagents would be a step toward further standardization of test performance and the establishment of a more constant universal level of sensitivity with given tests. Under these conditions oversensitive and undersensitive testing would readily become apparent. This has not been accomplished with positive serum controls in common use at present.

Evidence that there is a lack of common sensitivity is revealed by the necessity of classifying laboratories according to average levels of sensitivity (table 1) for an analysis of results of this evaluation of stable serum. In addition to a difference of levels of sensitivity among laboratories there were also fluctuations of sensitivity of daily results within given laboratories.

The other potential use of stabilized serum is in future National Serologic Evaluation Studies and the evaluation of laboratories within the States. For these uses a change may be required in our thinking, or a reconsideration of the basic purpose of such evaluations may be necessary.

The following statement has been made by the Committee on Evaluation of Serodiagnostic Tests for Syphilis (*2*): "The purpose of these studies is to improve and standardize the performance of serologic tests for syphilis in all laboratories so that uniform results may be obtained." This statement does not indicate that the primary purpose of such evaluations has been to improve sensitivity and specificity but rather to improve test performance. Improvement of sensitivity and specificity of a given test would seem to be within the province of the author serologist and not with the users of the tests unless it is plain that a modification of a particular test is used.

The above line of reasoning indicates that there are two types of evaluation which can be made in serologic testing: the evaluation of "test performance" and the determination of levels of "sensitivity and specificity" with given tests.

It is in the evaluation of test performance that stable dehydrated serum would appear to be a valuable replacement for whole-blood specimens. Each participant in an evaluation of test performance, employing specimens of dehydrated stable serum of varying reactivities, would be assured of specimens more nearly identical to those received by the author serologists. This, of course, cannot be as definitely assured by the use of whole-blood specimens mailed throughout the nation.

Laboratories could then be evaluated on ability to perform a given test, within narrow limits, in relation to the results of the author and perhaps a referee laboratory. Evaluations of this type would eliminate the ratings of sensitivity and specificity by State laboratories and place the sole responsibility for the establishment of these upon the author serologists.

The determination periodically of sensitivity and specificity of old and new tests might be more accurately established by the author serologists under well-controlled conditions similar to those of the Washington Serologic Conference. In this manner the collection and age of whole-blood specimens, working conditions, and other factors would be common to all author serologists at the time of the establishment of sensitivity and specificity of each test.

It appeared pertinent and logical to ask questions concerning these suggested uses of stable serum by the serologists engaged in this evaluation, pertinent in that the serologists may be considered future users of such serums and logical since they had used the serum for 1 year. The following two questions were asked:

"1. If the present evaluation demonstrates that the serum is stable and dependable for use with serologic tests for syphilis, would you have any objections to the use of serums of varying titers of this type in place of whole-blood specimens in the National Serologic Evaluation Studies?

"2. Do you think that dehydrated stable serum, labeled with an expiration date and a reactivity certified by the author serologist, would be of value to you as a daily or occasional control on the sensitivity of the serologic tests you perform? (I have no assurance that the author serologists would certify serum in this manner, but I feel the response of all participants on this aspect of stable serum is desirable at this time)."

Table 5 is a tabulation of replies to all the questionnaires that were returned. Some of the replies were enthusiastically

**Table 5.**—***Number and kind of replies received to questionnaires concerning possible uses of dehydrated serum***

| Proposed use of dehydrated serum | Analysis of replies to questionnaires | | | |
|---|---|---|---|---|
| | Favorable | Favorable with reservations | Unfavorable | Noncommittal |
| National evaluation of test performance | 23 | 9 | 10 | 4 |
| Daily or occasional control of sensitivity | 34 | 3 | 7 | 2 |

favorable toward one or both suggested uses, some were emphatically unfavorable, and some did not see any value whatsoever in either of the suggested uses. The author serologists made favorable replies, to one or both uses, though some did so with certain reservations.

In addition to the use of the serum as a daily control, or a whole or partial replacement of whole-blood specimens in National Evaluation Studies, the serum (when properly diluted) serves as a daily control or as a standard for cerebrospinal fluid total protein determinations and colloidal tests. Though the serum has not been analyzed statistically in this evaluation for use with the colloidal tests, it has previously been found satisfactory for use with the colloidal mastic test (*1*).

The level of sensitivity of total protein and colloidal tests was quite variable among the laboratories in this study. The stability of the serum indicates that it may be used also in a standardization program of these tests.

## Conclusions

Serum processed in a manner previously described has been found to maintain its reactivity without detectable loss for a minimum of 15 months in the dehydrated state and for 50 days after reconstitution, providing the serum is frozen.

Suggestions are offered concerning the use of dehydrated serum as a daily control with serologic tests for syphilis, total protein determinations, colloidal tests, and evaluation studies of test performance.

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1. CANNEFAX, GEORGE R.: A stable serum for standardizing the sensitivity of tests used in the diagnosis and control of syphilis. J. Ven. Dis. Inform., 30: 168–174, June 1949.
2. Report of the Committee on Evaluation of Serodiagnostic Tests for Syphilis. Interstate Evaluation Study of Serologic Methods, 1942. Ven. Dis. Inform., 23: 355–359, October 1942.

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# Studies on the Comparative Behavior of Various Serologic Tests for Syphilis[1]

## I. A Report on Serologic Findings Among Patients With Primary Syphilis at Beginning of Therapy

John C. Cutler, M. D.,[2] and Ad Harris[3]

In this report, serologic findings in patients with primary syphilis at the time of beginning therapy are discussed. This report is the first of a series in which an attempt is made to analyze the general serologic pattern and the individual variations observed in patients before and after treatment for syphilis in its early and in its later stages.

The first study group consists of 417 patients whose case records were selected alphabetically and without regard to color and sex from the files of all patients with early infectious syphilis who had been diagnosed and treated with penicillin during the period 1943–48 at the Venereal Disease Research Laboratory[4] and the United States Marine Hospital at Staten Island, N. Y. The following criteria formed the basis of selection:

1. A diagnosis of previously untreated, darkfield-positive primary syphilis. Reinfections were not included.
2. Each of a battery of seven serologic tests had been performed on the patient's serum.
3. Reasonable certainty that the patient's chancre was not older than 35 days at time of diagnosis.

The reason for excluding from this discussion patients with lesions older than 35 days was that, without exception, all such patients were seropositive to all tests. Since, in this study, we are concerned with the variations in the serologic pattern of a group of patients just becoming seroreactive, inclusion of patients who were already completely seroreactive obviously would not be helpful.

It was our opinion that the case records meeting the established criteria would afford a cross-sectional view of a group of patients with early primary syphilis, with respect to their serologic status at beginning of therapy. The development of seroreactivity in the untreated individual as shown by a battery of tests will be the subject of a subsequent report. Nevertheless, it should be kept in mind that our patients were predominately young white males, merchant seamen entitled to free and convenient medical care and generally well-informed about venereal disease symptoms and the advantages of seeking early treatment. It is probable, therefore, that not every group of patients with primary syphilis will show the serologic pattern which we observed, inasmuch as recent studies (*1, 2, 3*) of civilian patients reporting to civilian clinics indicate a somewhat longer time lag between observance of first symptom and beginning of treatment than occurred among our patients. A longer time interval between developing a chancre and reporting for treatment

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[3] Assistant Director, in charge Serology Section, Venereal Disease Research Laboratory, Chamblee, Ga.

[4] Now located at Chamblee, Ga.

Note: Grateful acknowledgment is made to Margaret Merrell, Sc. D., Associate Professor of Biostatistics, Johns Hopkins School of Hygiene and Public Health; and Clifford A. Bachrach, M. D., M. P. H., Instructor in Biostatistics, John Hopkins School of Hygiene and Public Health, for advice, assistance, and criticism in the preparation of this work.

would tend to minimize the extent of serologic discrepancy.

Among the 417 patients in our sample, 100 showed "serologic discrepancy" (i. e., positive reaction in one or more tests, but negative reactions with the same serum in the other tests); 225 patients showed serologic reactivity in all seven of the battery of tests; and 92 patients showed an absence of reactivity in all the tests. For the purpose of this study, serologic reactivity was defined as a reading of ±, ± doubtful, or greater, by any procedure.

The terms "pattern of serologic reactivity," or "serologic pattern," as used in this paper, are based on the concept that in primary syphilis there will be a period when the serum tested by a battery of tests will show reactivity by certain procedures and lack of reactivity by others—i. e., the serum will show serologic discrepancy. (This phenomenon will occur also following successful treatment for early syphilis, when the patient is passing from seropositivity to seronegativity.) It is obvious, then, that in any sample group selected for study, it is those patients whose serums show discrepant results who will determine the pattern of variations to be found within the limits of complete reactivity and lack of reactivity.

Our serologic analysis is concerned with the comparative behavior, as observed among the patients, of the seven commonly utilized serologic tests for syphilis using beef heart antigen: Kline exclusion, Mazzini flocculation, Kline diagnostic, Kahn standard, Hinton, Eagle flocculation, and Kolmer. Cardiolipin-lecithin antigens were not used in any of the testing procedures referred to in this paper. Each test was performed in exact accordance with the author serologist's directions and with antigens set at a level of sensitivity and specificity required by the author serologist (*4, 5, 6*).

Blood specimens sent to the Venereal Disease Research Laboratory for serologic testing entered the serology laboratory identified only by number and without accompanying information about the clinical status of the donor or darkfield findings. All specimens received each day were tested as a group, so no particular sample had special consideration. It is believed, therefore, that all precautions were taken to preclude the possibility of favoritism for any particular procedure, and that certain general conclusions with respect to the serologic findings can be drawn.

### Discussion

The distribution of seroreactivity prior to therapy, by each procedure used to examine the 417 patients with primary syphilis, is shown below.

| Test: | *Percent of patients whose serum specimens showed reactivity* |
|---|---|
| Kline exclusion | 74 |
| Mazzini flocculation | 70 |
| Kline diagnostic | 62 |
| Kahn standard | 62 |
| Hinton | 63 |
| Eagle flocculation | 61 |
| Kolmer | 62 |

As might be expected, the two procedures showing the highest ratio of reactivity among the patients are the Kline exclusion (74 percent) and the Mazzini flocculation (70 percent). All the other procedures show about the same ratio of reactivity (61 to 63 percent). It seems evident, then, that the Kline exclusion test should detect a larger proportion of reactors in primary syphilis than the Mazzini flocculation, and that the other procedures should be about equal, one to the others, in their capacity to detect reactors.

It should be remembered that the Kline exclusion test is set by the author serologist at a very high level of sensitivity, so as to discover a maximum number of reactions. Reactive samples of serum can then be subjected to a more specific diagnostic procedure. The Mazzini flocculation test is set at an intermediate level of reactivity. The other tests in this battery are set somewhat lower. In constructing serologic tests, the author serologists must consider both sensitivity and specificity in arriving at optimum

### Table 1.—*Comparison of serologic results by duration of chancre among 417 patients with primary syphilis*

| Serologic results | Number of patients (column A) | Percent of total group | Duration of chancre (days) | | | | | | | | | | | | | | | Total percent |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1–7 | | | 8–14 | | | 15–21 | | | 22–28 | | | 29–35 | | | |
| | | | Number of patients | Percent of— | | Number of patients | Percent of— | | Number of patients | Percent of— | | Number of patients | Percent of— | | Number of patients | Percent of— | | |
| | | | | Patients with lesions of 1–7 days' duration | Patients in column A | | Patients with lesions of 8–14 days' duration | Patients in column A | | Patients with lesions of 15–21 days' duration | Patients in column A | | Patients with lesions of 22–28 days' duration | Patients in column A | | Patients with lesions of 29–35 days' duration | Patients in column A | |
| Completely reactive | 225 | 54 | 59 | 34 | *26* | 72 | 59 | *33* | 45 | 70 | *20* | 21 | 84 | *9* | 28 | 90 | *12* | *100* |
| Discrepant | 100 | 24 | 45 | 26 | *45* | 34 | 28 | *34* | 15 | 24 | *15* | 3 | 12 | *3* | 3 | 10 | *3* | *100* |
| Completely negative | 92 | 22 | 71 | 40 | *78* | 16 | 13 | *17* | 4 | 6 | *4* | 1 | 4 | *1* | 0 | 0 | *0* | *100* |
| Total | 417 | 100 | 175 | 100 | -------- | 122 | 100 | -------- | 64 | 100 | -------- | 25 | 100 | -------- | 31 | 100 | -------- | -------- |

levels of sensitivity appropriate to the manner in which the tests will be used. Specificity is generally considered to be of greater importance than sensitivity in routine tests, since most authorities are agreed that it is better to miss an occasional patient with syphilis through the use of a less sensitive procedure rather than to find a large number of biologic false-positive reactions through the use of a highly sensitive but less specific procedure.

In table 1, the composition of the total group of 417 patients is shown with respect to the age of the chancre and the serologic status in each time category. The striking finding that emerges here is that in this total group, which represents a cross section of our patients with primary syphilis, a little more than half were found to be reactive by each one of the battery of serologic tests; about one-fourth showed serologic discrepancy; and almost one-fourth showed complete seronegativity. When the pattern of reactivity is considered by age of chancre, it is noted that serologic discrepancy was found in approximately one-fourth of those patients seen at any time between the day of appearance of the chancre and the twenty-first day of its duration. A sharp decrease is seen in the proportion of completely seronegative reactions among patients whose lesions were older than 15 days. In fact, complete seronegativity by the entire battery of tests was not observed in any patient in whom the lesion had been present for more than 28 days.

In table 2, the individual tests among both the total and discrepant groups are considered with respect to reactivity as related to the age of the chancre. The findings again reflect the differences in levels of sensitivity set by the author serologists, and the proportionate increase of serologically reactive patients as the duration of the chancre increases. Here, too, it is noted that throughout the time category, the Kline exclusion test produced a higher over-all ratio of reactivity than any other procedure; that the Mazzini flocculation test produced the second highest ratio of reactivity; and that the other diagnostic procedures parallel one another at a lower level (except when the number of patients in a category is so small that percentages are distorted).

Many authorities have advocated that each specimen of serum should be tested by at least two procedures, with the frequent recommendation that one should be a precipitation test, and the other, a complement-fixation test. Our comparisons among pairs of tests in the group of 417 patients are found in table 3.

Results from testing any specimen by the Kline exclusion and the Kline diagnostic tests followed a certain pattern of agreement in that a serum which was found to be reactive to the Kline diagnostic was always found to be reactive to the Kline exclusion; however, when results from the Kline exclusion test were compared with results from any other test in the battery except the Kline diagnostic, serologic reactivity was demonstrated occasionally by the other test in opposition to negative results from the Kline exclusion test. One and seven-tenths percent of the serum specimens were reactive to the Mazzini flocculation test while negative to the Kline exclusion test. Reactivity to the other tests (except the Kline diagnostic) was shown in this same relationship in a slightly lower percentage of the serums, ranging from 0.2 percent by the Kahn to 1.2 percent by the Hinton.

In almost the same range (0.7 percent by the Kline diagnostic to 2.4 percent by the Hinton), results from the Mazzini flocculation test were negative while results from any of the less sensitive diagnostic tests were reactive. Finally, in the various pairs to be found among the Kline diagnostic, Kahn, Hinton, Eagle flocculation, and Kolmer tests, discrepant results were about evenly divided in respect to negativity in one and reactivity in another (3.1 to 6.5 percent of cases). Only the Hinton test showed negativity at a level as low as 1.4 percent, while another diagnostic test (Eagle flocculation) showed reactivity.

Table 2.—*Comparisons of serologic reactivity by each procedure in relation to the duration of chancre, among total group of 417 patients with primary syphilis and among 100 of these patients showing discrepant results*

| Test | Duration of chancre (days) | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1-7 | | | | 8–14 | | | | 15–21 | | | | 22–28 | | | | 29–35 | | | |
| | 175 patients of total group | | 45 patients of discrepant group | | 122 patients of total group | | 34 patients of discrepant group | | 64 patients of total group | | 15 patients of discrepant group | | 25 patients of total group | | 3 patients of discrepant group | | 31 patients of total group | | 3 patients of discrepant group | |
| | Patients showing serologic reactions | | | | | | | | | | | | | | | | | | | |
| | Number | Percent of 175 patients | Number | Percent of 45 patients | Number | Percent of 122 patients | Number | Percent of 34 patients | Number | Percent of 64 patients | Number | Percent of 15 patients | Number | Percent of 25 patients | Number | Percent of 3 patients | Number | Percent of 31 patients | Number | Percent of 3 patients |
| Kline exclusion | 97 | 55 | 38 | 84 | 101 | 83 | 29 | 85 | 57 | 89 | 12 | 80 | 24 | 96 | 3 | 100 | 31 | 100 | 3 | 100 |
| Mazzini | 85 | 49 | 26 | 58 | 94 | 77 | 22 | 65 | 57 | 89 | 12 | 80 | 23 | 92 | 2 | 67 | 31 | 100 | 3 | 100 |
| Kline diagnostic | 74 | 42 | 15 | 33 | 85 | 70 | 13 | 38 | 51 | 80 | 6 | 40 | 21 | 84 | 0 | 0 | 28 | 90 | 0 | 0 |
| Kahn standard | 71 | 41 | 12 | 27 | 85 | 70 | 13 | 38 | 51 | 80 | 6 | 40 | 22 | 88 | 1 | 33 | 24 | 77 | 1 | 33 |
| Hinton | 76 | 43 | 17 | 38 | 87 | 71 | 15 | 44 | 50 | 78 | 5 | 33 | 23 | 92 | 2 | 67 | 28 | 90 | 0 | 0 |
| Eagle | 70 | 40 | 11 | 24 | 85 | 70 | 13 | 38 | 50 | 78 | 5 | 33 | 22 | 88 | 1 | 33 | 28 | 90 | 0 | 0 |
| Kolmer | 72 | 41 | 13 | 29 | 82 | 67 | 10 | 29 | 51 | 80 | 6 | 40 | 23 | 92 | 2 | 67 | 23 | 74 | 1 | 33 |

Table 3.—*Comparisons between pairs of serologic tests in total group of 417 patients with primary syphilis*

| Test combinations | Both procedures reactive | | Both procedures nonreactive | | Serologic discrepancy | | |
|---|---|---|---|---|---|---|---|
| | Number | Percent of total group | Number | Percent of total group | Combined tests and reactions | Number | Percent of total group |
| Kline exclusion—Mazzini | 283 | 68 | 100 | 24 | Kline exclusion positive; Mazzini negative<br>Kline exclusion negative; Mazzini positive | 27<br>7 | 6.5<br>1.7 |
| Kline exclusion—Kline diagnostic | 259 | 62 | 107 | 26 | Kline exclusion positive; Kline diagnostic negative<br>Kline exclusion negative; Kline diagnostic positive | 51<br>0 | 12.2<br>0 |
| Kline exclusion—Kahn | 257 | 62 | 106 | 25 | Kline exclusion positive; Kahn negative<br>Kline exclusion negative; Kahn positive | 63<br>1 | 12.7<br>.2 |
| Kline exclusion—Hinton | [illegible] | 62 | 106 | 25 | Kline exclusion positive; Hinton negative<br>Kline exclusion negative; Hinton positive | 51<br>5 | 12.2<br>1.2 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Kline exclusion—Hinton | 259 | 62 | 106 | 25 | Kline exclusion positive; Hinton negative | 51 | 12.2 |
| | | | | | Kline exclusion negative; Hinton positive | 5 | 1.2 |
| Kline exclusion—Eagle | 252 | 60 | 104 | 25 | Kline exclusion positive; Eagle negative | 58 | 13.9 |
| | | | | | Kline exclusion negative; Eagle positive | 3 | .7 |
| Kline exclusion—Kolmer | 255 | 61 | 105 | 25 | Kline exclusion positive; Kolmer negative | 55 | 13.2 |
| | | | | | Kline exclusion negative; Kolmer positive | 2 | .5 |
| Mazzini—Kline diagnostic | 256 | 61 | 124 | 30 | Mazzini positive; Kline diagnostic negative | 34 | 8.2 |
| | | | | | Mazzini negative; Kline diagnostic positive | 3 | .7 |
| Mazzini—Kahn | 252 | 60 | 121 | 29 | Mazzini positive; Kahn negative | 38 | 9.1 |
| | | | | | Mazzini negative; Kahn positive | 6 | 1.4 |
| Mazzini—Hinton | 254 | 61 | 117 | 29 | Mazzini positive; Hinton negative | 36 | 8.6 |
| | | | | | Mazzini negative; Hinton positive | 10 | 2.4 |
| Mazzini—Eagle | 250 | 60 | 122 | 29 | Mazzini positive; Eagle negative | 40 | 9.6 |
| | | | | | Mazzini negative; Eagle positive | 5 | 1.2 |
| Mazzini—Kolmer | 251 | 60 | 121 | 29 | Mazzini positive; Kolmer negative | 39 | 9.4 |
| | | | | | Mazzini negative; Kolmer positive | 6 | 1.4 |
| Kline diagnostic—Kahn | 245 | 59 | 145 | 35 | Kline diagnostic positive; Kahn negative | 14 | 3.4 |
| | | | | | Kline diagnostic negative; Kahn positive | 13 | 3.1 |
| Kline diagnostic—Hinton | 241 | 58 | 135 | 32 | Kline diagnostic positive; Hinton negative | 23 | 5.5 |
| | | | | | Kline diagnostic negative; Hinton positive | 18 | 4.3 |
| Kline diagnostic—Eagle | 236 | 57 | 139 | 33 | Kline diagnostic positive; Eagle negative | 23 | 5.5 |
| | | | | | Kline diagnostic negative; Eagle positive | 19 | 4.6 |
| Kline diagnostic—Kolmer | 240 | 58 | 140 | 34 | Kline diagnostic positive; Kolmer negative | 19 | 4.6 |
| | | | | | Kline diagnostic negative; Kolmer positive | 17 | 4.1 |
| Kahn—Hinton | 243 | 58 | 138 | 33 | Kahn positive; Hinton negative | 15 | 3.6 |
| | | | | | Kahn negative; Hinton positive | 21 | 5.0 |
| Kahn—Eagle | 239 | 57 | 143 | 34 | Kahn positive; Eagle negative | 19 | 4.6 |
| | | | | | Kahn negative; Eagle positive | 16 | 3.8 |
| Kahn—Kolmer | 239 | 57 | 142 | 34 | Kahn positive; Kolmer negative | 18 | 4.3 |
| | | | | | Kahn negative; Kolmer positive | 18 | 4.3 |
| Hinton—Eagle | 249 | 60 | 147 | 35 | Hinton positive; Eagle negative | 15 | 3.6 |
| | | | | | Hinton negative; Eagle positive | 6 | 1.4 |
| Hinton—Kolmer | 237 | 57 | 133 | 32 | Hinton positive; Kolmer negative | 27 | 6.5 |
| | | | | | Hinton negative; Kolmer positive | 20 | 4.8 |
| Eagle—Kolmer | 233 | 56 | 138 | 33 | Eagle positive; Kolmer negative | 22 | 5.3 |
| | | | | | Eagle negative; Kolmer positive | 24 | 5.8 |

It is seen, then, that in our experience, results from the Kline exclusion and the Mazzini flocculation tests were nonreactive in no more than 1 to 2 percent of the patients with primary syphilis who showed reactivity by any one of the other tests in the battery. On the other hand, these two tests, within a range of 8.2 to 13.9 percent of patients, showed reactivity while negativity was shown by any one of the other tests in this battery. A comparison of the Kline exclusion test with the Mazzini flocculation test in this respect shows that results from the former were reactive and results from the latter were negative in 6.5 percent of cases.

In considering at what rate any pair of tests showed combined nonreactivity, we noted that about one-fourth of the patients were negative by any combination with the Kline exclusion; about 29 percent were negative by any combination with the Mazzini; and any combination of the remaining diagnostic procedures showed negativity in both tests among 32 to 35 percent of the patients.

If the 417 patients considered in this report may be considered to be representative of all individuals with early primary syphilis, the following generalizations may be made: The more sensitive serologic tests (such as the Kline exclusion and the Mazzini flocculation) can be expected to show serologic reactivity among patients with early primary syphilis more frequently than the other tests employed in this study (Kline diagnostic, Kahn standard, Hinton, Eagle flocculation, and Kolmer); and, among the latter group of tests, the levels of sensitivity are about equal, with no one test showing significant superiority over another.

Individual differences in the pattern of serologic response to infection with *Treponema pallidum* have long been recognized, and have been discussed by other investigators (*7*, *8*, *9*, *10*, *11*, *12*). We observed in this study, for instance, that serums occasionally were found to be reactive to one or more of each of the less sensitive diagnostic tests, while being negative to either the Kline exclusion or Mazzini flocculation test. The only constant relationship noted in this respect was that a serum was never reactive to the Kline diagnostic test when negative to the Kline exclusion test. Eagle (*13*) has pointed out that each of the procedures under consideration is testing for reagin in the serum. Each of the antigens consists of a complex of substances, the most important of which we now know to be cardiolipin. It is entirely possible that in some individuals there are different substances in the serum which react with other components of the various serologic systems found in the several tests. Whether these substances are naturally present in the individual or whether they are formed, in addition to reagin, in the presence of syphilitic infection is a matter for continued study. Rein (*14*) and Thomas (*15*) have provided further discussions along this line which will not be elaborated here. Widelock (*16*) recently presented a relevant report on certain false-positive human serums containing large amounts of an antibody which reacts with impurities in the syphilis reagin. Some of the variations noted by us may be related to such reagin-like substances found in certain individuals. Variations also may be related simply to the time required by the individual to elaborate reagin in quantity sufficient to reach the threshold of reactivity of a given procedure. Regardless of the fact that the mechanisms involved are not completely understood, our findings, like those of most other investigators in the field, stress the fact that individual variations in serologic patterns do exist, are to be expected, and must be taken into consideration in the serodiagnosis of syphilis.

## Summary and Conclusions

Among 417 patients with primary syphilis, the following serologic responses prior to therapy were observed:

1. Serum specimens of approximately one-half the patients were reactive to each test in a battery of seven standard serologic tests for syphilis using beef heart antigens; about one-fourth were negative; and about one-fourth showed "serologic discrepancy," i. e., disagree-

ment among the various tests in the battery.

2. The longer the chancre was present, the less was the likelihood of finding the patient to be completely seronegative to all the tests in the battery. Seronegativity to all tests in the battery was not observed when the chancre had been present for more than 28 days, and was rare if the chancre had been present for 2 weeks or longer.

3. Serologic discrepancy was related also to the duration of the chancre, in that about one-fourth of patients seen at any time between the first and twenty-first days after the appearance of the chancre showed discrepant results. After the lesion had been present for 15 days, there was a sharp decline in the percentage of such findings.

4. Study of the individual reactions to the various tests revealed that the serums of 74 percent of the group of 417 patients were reactive to the Kline exclusion test; 70 percent were reactive to the Mazzini flocculation test; and 60 to 63 percent were reactive to the other tests employed.

5. When serologic results were compared by pairs of tests, the following observations were made:

(*a*) A serum was never observed to be reactive to the Kline diagnostic test when negative to the Kline exclusion test. In all other pairs, seroreactivity by one procedure might be found in opposition to seronegativity by another.

(*b*) When results from either the Kline exclusion or Mazzini flocculation tests were compared with the results from any other test in the battery, approximately 1 to 2 percent of the samples were reactive to the less sensitive procedure while negative to the Kline exclusion or Mazzini flocculation. However, 8 to 14 percent of the samples showed reactivity to the Kline exclusion and Mazzini flocculation tests when the result from any other test in the battery was negative.

(*c*) Discrepant results were about evenly divided in respect to negativity in one and reactivity in another (3.1 to 6.5 percent) when any two of the less sensitive tests were paired.

(*d*) Complete seronegativity by any two procedures, one of which was the Kline exclusion test, was found in about one-fourth of the samples of serum tested. When any one of the two procedures was the Mazzini flocculation test, complete seronegativity by both procedures was found in 29 percent of the samples. Any combination of the less sensitive tests showed complete seronegativity in 32 to 35 percent of the samples.

Thus, our general observations among this group of patients with primary syphilis are as follows:

The Kline exclusion test was found to be the most highly reactive; the Mazzini flocculation ranked second; and the Kline diagnostic, Kahn standard, Hinton, Eagle flocculation, and Kolmer ranked somewhat lower, with almost identical levels of sensitivity.

There was no single test which detected all the samples of serum showing serologic reactivity, but the highest proportion of reactive samples was obtained with the combination of the Kline exclusion and Mazzini flocculation tests.

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# CURRENT LITERATURE

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## A. M. A. Arch. Int. Med., Chicago

Epilepsy in systemic lupus erythematosus: Effect of cortisone and ACTH. Philip W. Russell, John R. Haserick, and Edward M. Zucker. A. M. A. Arch. Int. Med., 88: 78–92, July 1951.

Purpose of the report is to present cases of systemic lupus erythematosus in which epileptiform seizures, electroencephalographic abnormalities, or histopathologic brain changes have indicated involvement of the central nervous system. Among 28 consecutive patients with positive reactions to L. E. tests, observed at the Cleveland Clinic since February 1949, 7 (25 percent) experienced convulsions. One of these, a 41-year-old woman, had a low-grade illness of long duration, masquerading as latent syphilis. Authors feel that the fact that systemic lupus erythematosus may smolder for years before fulminating into the active stage is not sufficiently appreciated, and most textbooks and pertinent reviews ignore this point. An example is cited from the literature in which false-positive reactions to tests for syphilis antedated onset of clinical systemic lupus erythematosus in 4 of 5 patients who had received antisyphilitic treatment during the course of their disease.

Q fever in California. VII. Clinical features in one hundred eighty cases. William H. Clark, Edwin H. Lennette, Oscar C. Railsback, and Mary S. Romer. A. M. A. Arch. Int. Med., 88: 155–167, Aug. 1951.

A report is presented on clinical observations of 180 patients with Q fever in northern California. Of 102 of the patients tested by the qualitative Kolmer method, 6.8 percent gave a positive reaction for syphilis at some time during their illness, usually in the second to sixth week. On clinical recovery from the rickettsial infection, all patients had a negative Kolmer reaction.

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## Acta dermat.-venereol., Stockholm

Newer concepts of therapy in syphilis. E. H. Hermans. Acta dermat.-venereol., 31: 375–390, No. 4, 1951.

An extensive review of the literature on treatment of the various types of syphilis with penicillin is presented.

Dihydrostreptomycin in gonorrhea. Tauno Putkonen and Sirkka Rouhunkoski. Acta dermat.-venereol., 31: 391–394, No. 4, 1951.

A report is presented on the treatment of 143 female gonorrhea patients at the Kumpula State Hospital for Venereal Diseases, Helsinki. The results showed that with a dose of 0.1 gm. of dihydrostreptomycin cure was effected in 16 out of 24 (66.7 percent), with a dose of 0.2 gm. in 23 out of 30 (76.7 percent), and with a dose of 0.4 gm. in 86 out of 89 (96.6 percent). In a control group of 68 women with gonorrhea treated with 150,000 units of procaine penicillin in oil, cures were obtained in 65 (95.6 percent) of the patients. Authors recommended dihydrostreptomycin for treatment of gonorrhea when syphilis was also suspected, because this antibiotic did not kill spirochetes when given in doses sufficient for the gonorrhea.

A primary chancre of the vagina. (Report of a case.) Tauno Putkonen. Acta dermat.-venereol., 31 : 395–397, No. 4, 1951.

The patient was a married woman whose husband contracted a syphilitic infection from a woman in whom secondary syphilis was noted on August 20, 1948. A primary chancre developed in the upper third of the vagina 22 to 30 days after infection by the husband.

Venereal diseases in Iceland. Hannes Gudmundsson. Acta dermat.-venereol., 31 : 412–418, No. 4, 1951.

This is a general discussion on the incidence, treatment, and prevention and control of venereal diseases in Iceland. While Iceland was practically free from venereal diseases before 1900, an average of 25.5 new syphilitic infections were reported annually between 1920 and 1940. An average of 578.5 new gonorrheal infections were also reported annually between 1930 and 1940.

Increase of sensitivity to organic luetin on repeated testing. Georg Seeberg. Acta dermat.-venereol., 31 : 442–445, No. 4, 1951.

In this study, skin tests with organic luetin, extracted from rabbit syphilomas, were performed on 28 children with congenital syphilis at 6-day intervals. Twenty-four of the children showed increased sensitivity to the second test, while 2 failed to respond to any and 2 responded to the third test.

Case of lymphogranuloma venereum treated with aureomycin. V. A. Norman. Transactions of the Swedish Dermatological Society. Acta dermat.-venereol., 31 : 496–497, No. 4, 1951.

Case history of a 29-year-old seaman admitted to St. Göran's Hospital with lymphogranuloma venereum is presented. The patient responded to a treatment of 500 mg. of aureomycin given four times a day for 6 days.

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## AM. J. CLIN. PATH., BALTIMORE

Rapid detection of high-titered serums in Kline test. Dorothy Lee. Am. J. Clin. Path., 21 : 499–500, May 1951.

A preliminary reading of the Kline test after 20 seconds using cardiolipin standard antigen and after 30 seconds using the diagnostic antigen will detect serums of high titer including those exhibiting the prozone phenomenon and atypical flocculation. The reactions of 1,000 serums are shown in table form. All serums with a reading of 44442 or higher gave a strong preliminary reaction in 20 seconds, with the exception of four strong prozone or atypical reactions.

The complement-fixation test in the diagnosis of lymphogranuloma venereum. Donald G. Wetherbee, Richard J. Hilfer, Barbara Maspero, and Dwight M. Kuhns. Am. J. Clin. Path., 21 : 521–529, June 1951.

In 27 patients with a clinical diagnosis of lymphogranuloma venereum, 93 percent showed positive complement-fixation tests in serum dilution of 1 : 40 or higher. In 252 patients with syphilis in various stages, only 7.4 percent gave positive lymphogranuloma venereum complement-fixation reaction in serum dilution of at least 1 : 5. A positive complement-fixation reaction of 1 : 40 or higher in a single test is evidence of infection with a member of the psittacosis-lymphogranuloma group of viruses.

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## AM. J. M. SC., PHILADELPHIA

The musical murmur of aortic insufficiency : clinical manifestations : based on a study of 18 cases. David Gelfand and Samuel Bellet. Am. J. M. Sc., 221 : 644–654, June 1951.

Clinical manifestations and etiology of

musical diastolic murmur of aortic insufficiency in 18 patients, including 11 with syphilis, are discussed. Case histories of 6 of the patients are presented in detail. The prognosis in the patients with syphilitic etiology was not so grave as was considered to be the case in a previous report (1939).

### AM. J. OBST. & GYNEC., ST. LOUIS

Bacteriuria during pregnancy. J. Bernard Bernstine and George H. Warren. Am. J. Obst. & Gynec., 61 : 1329–1334, June 1951.

A report is presented of special urinary bacteriologic studies of 48 pregnant women selected at random from those attending the maternity out-patient department of the Jefferson Medical College. Data presented on conditions complicating pregnancy in the 48 patients indicate that 1 had gonorrhea, 1 had granuloma inguinale, 1 had *Trichomonas vaginalis* vaginitis, and 8 had syphilis.

### AM. J. OPHTH., CHICAGO

Aureomycin as prophylaxis against ophthalmia neonatorum. Samuel G. Clark and Arthur M. Culler. Am. J. Ophth., 34 : 840–847, June 1951.

A total of 1,442 infants delivered at Mount Carmel and University Hospitals, Columbus, Ohio, from Dec. 1, 1948, to Nov. 20, 1949, were observed daily during their hospital stay, usually 7 days. As a control, 442 newborn infants were given prophylaxis against ophthalmia neonatorum with 1-percent silver nitrate while 1,000 infants received a single instillation of 0.5-percent solution of aureomycin borate. No conclusions as to the efficiency of aureomycin as a prophylaxis can be drawn from this study, but no serious sequelae were encountered in this trial of the drug.

### AM. J. PUB. HEALTH, NEW YORK

Current experience in multiphasic health examinations. Orientation and background. Leonard A. Scheele. Am. J. Pub. Health, 41 : 635–639, June 1951.

The author praises multiple screening as a promising public health procedure. The concept is basically sound and fits in admirably with the current trend in public health work toward a unity and greater integration of programs. Effective screening of diseases, such as syphilis and tuberculosis, is a valuable control method, since every case brought under treatment removes a source of infection from the population.

Current experience of multiphasic health examinations. Experience at Richmond. E. M. Holmes, Jr., and Paul W. Bowden. Am. J. Pub. Health, 41 : 640–641, June 1951.

Tests were made on 37,329 persons for syphilis, diabetes, anemia, blood pressure, heart abnormalities, tuberculosis, hearing, and vision during a 7-month period ending July 30, 1950. The Kahn presumptive test segregated 322 persons for further investigation. It was thought that the survey stimulated public interest in health, enhanced patient-physician good will, encouraged good will and cooperation between the health department and local voluntary agencies, and was economical.

Current experience in multiphasic health examination. Experience at Atlanta. C. D. Bowdoin. Am. J. Pub. Health, 41 : 641–642, June 1951.

During a 3-month period, 236,000 individuals were tested. Of 228,266 tested for syphilis by the VDRL rapid slide test, there were 22,395 reactors. Those with positive or doubtful findings were called back for a repeat VDRL test and a confirmatory Kahn test. On the second test, 1,314 of the original reactors retested were found to be positive. The Greater Atlanta Survey substantiated the assumption that a multiple screening project, with proper publicity and choice of station locations, is a most effective method of getting people in for examination.

Current experience in multiphasic health examinations. Experience in Alabama. W. H. Y. Smith. Am. J. Pub. Health, 41 : 642, June 1951.

In Alabama's multiple screening program, tests were given for heart disease, tuberculosis, diabetes, and syphilis. Completed examinations showed 4,747 persons with syphilis out of 221,312 tested in 16 counties.

Current experience in multiphasic health examinations. Experience at Boston, Mass. Vlado A. Getting and Claire F. Ryder. Am. J. Pub. Health, 41 : 643–644, June 1951.

In the period December 1, 1949, to June 30, 1950, 2,620 persons were screened. Procedures included a 222-question self-screener medical history filled out by the patient before examination, blood, urine, vision, and hearing tests, chest X-ray, blood pressure readings, measurement of height and weight, temperature, pulse and respiration, and a rectal and pelvic examination where indicated. In the first 2,000 screenees, 1,730 previously unknown conditions were found, of which 8 were syphilis.

Current experience in multiphasic health examinations. Experience at Indianapolis. Gerald F. Kempf. Am. J. Pub. Health, 41 : 644–645, June 1951.

The pilot study in multiple screening at Indianapolis was conducted at the Herman G. Morgan Center which serves a population of more than 80,000 Negroes. Of the 2,022 persons examined, 37 percent had more serious defects such as cardiovascular diseases, diabetes, renal disease, syphilis, and tuberculosis.

Survey of laboratory-acquired infections. S. Edward Sulkin and Robert M. Pike. Am. J. Pub. Health, 41 : 769–781, July 1951.

Type of accident responsible for the largest number of infections was associated with use of a hypodermic needle and syringe. Infection does not necessarily result when an accident occurs. One laboratory worker accidently introduced into his skin a needle attached to a syringe containing *Treponema pallidum*. No visible infection resulted, and serologic tests for syphilis remained negative. Six cases of lymphogranuloma venereum are listed under viral infections acquired by trained scientific personnel.

### AM. J. ROENTGENOL., SPRINGFIELD

Interpretation of normal cardiovascular angiograms. With a discussion of common errors. Marcy L. Sussman and Sigmund A. Brahms. Am. J. Roentgenol., 66 : 29–36, July 1951.

Certain technical difficulties in the production and interpretation of angiocardiograms are outlined. Authors think that when an aneurysm is due to syphilitic aortitis but does not fill with Diodrast, a diagnosis can be made by the demonstration of irregular dilatation of other portions of the aorta. A warning is given regarding such diagnosis, however, since dilatation of the aorta occurs quite often in hypertension, beyond an area of coarctation, and not infrequently beyond congenital aortic valvular stenosis.

### AM. J. SURG., NEW YORK

Cornual resection for the treatment of recurrent salpingitis. Henry C. Falk. Editorial. Am. J. Surg., 81 : 595–598, June 1951.

In discussing the pathogenesis of recurrent salpingitis, the gonococcus is said to be the original infecting organism in most cases of primary salpingitis and the mode of extension of infection is via the surface epithelium, the sequence being endocervicitis, endometritis, and endosalpingitis. The literature is reviewed, and the procedure known as cornual resection for the treatment of recurrent salpingitis is discussed.

### AM. J. SYPH., GONOR. & VEN. DIS., ST. LOUIS

Cerebral blood flow and metabolism in neurosyphilis. The effects of penicillin, induced fever, and other therapeutic measures. Albert Heyman, John L. Patterson, Jr., Fenwick T. Nichols, Jr., and Rudolph W. Jones. Am. J. Syph., Gonor. & Ven. Dis., 35 : 301–311, July 1951.

The nitrous oxide technic was used to study 69 patients with various types of neurosyphilis. Changes in cerebral circulation and metabolism produced by penicillin therapy, induced fever, and other therapeutic measures were investigated. The mean cerebral blood flow and oxygen consumption were significantly reduced in patients with untreated dementia paralytica and meningovascular syphilis, while the vascular resistance was increased. There was a definite correlation between the degree of mental deterioration and the reduction in oxygen consumption in patients with dementia paralytica. There was little change observed in the cerebral blood flow or oxygen consumption in patients with asymptomatic neurosyphilis during fever induced by typhoid bacterial pyrogen.

The problem of the Jarisch-Herxheimer reaction in the penicillin therapy of cardiovascular syphilis. H. A. Sinclaire and Bruce Webster. Am. J. Syph., Gonor. & Ven. Dis., 35: 312–318, July 1951.

The authors report on 53 patients at the New York Hospital who were treated with penicillin with dosages varying from 2 to 12 million units. The only symptoms observed were mild temperature rises during the first 48 hours of treatment in 6 patients who also had neurosyphilis. It is the belief of the authors that enough evidence has been presented from a review of recent literature and the findings in this present study to support the belief that penicillin is the agent of choice and should be used alone in the treatment of cardiovascular syphilis.

Treatment of cardiovascular syphilis with penicillin. Clayton E. Wheeler and Arthur C. Curtis. Am. J. Syph., Gonor. & Ven. Dis., 35: 319–328, July 1951.

A review of the literature indicated a tendency to treat cardiovascular syphilis with penicillin and with no certain evidence of harmful result being found. The present study concerned 21 patients who either received no treatment previous to penicillin or who received such small amounts of treatment years before that they were regarded as untreated. In no instance was there an adverse effect in the form of a Herxheimer reaction or a therapeutic paradox.

Syphilitic paroxysmal cold hemoglobinuria causing transfusion reaction: response to penicillin. Norman P. Hill. Am. J. Syph., Gonor. & Ven. Dis., 35: 329–333, July 1951.

Case history is presented of an 80-year-old man with syphilitic paroxysmal cold hemoglobinuria who presented two aspects of the disease not previously mentioned in the literature, namely, a transfusion reaction caused by the cold-warm hemolysins and the disappearance of these hemolysins after adequate penicillin therapy. The diagnosis of syphilis was confirmed by a positive treponemal immobilizing test.

Congenital syphilis in one of apparently identical twins. Raymond A. Raskin. Am. J. Syph., Gonor. & Ven. Dis., 35: 334–339, July 1951.

From a review of the literature, it is shown that there have been few authentic cases of identical twins in whom one had congenital syphilis and the other did not. A case report is presented on male twins, born at the Beth Israel Hospital in New York City, one of whom was infected. A definite explanation is lacking.

Recent advances in the serodiagnosis of syphilis. Vittorio A. Puccinelli. Am. J. Syph., Gonor. & Ven. Dis., 35: 340–349, July 1951.

Results of studies made by various investigators on the Wassermann reaction in Italy during the last few years are reported. Results, which are summarized, include those of reagins found in various stages of syphilis. The data reported represent a complex of serologic elements that have important clinical applications in the diagnosis, prognosis, and therapeutic indications in syphilitic infections.

Quantitative spinal fluid protein determination. A comparative study. Benjamin A. Gross. Am. J. Syph., Gonor. & Ven. Dis., 35: 350–355, July 1951.

A comparative study was made of procedures used in various clinics for determining the quantitative spinal fluid protein. The turbidimetric method using a photoelectric colorimeter gave consistent and reproducible results with ease of performance, economy of fluid, and accuracy as compared with the micro-Kjeldahl method which gave unequivocal results but did not lend itself to ease of performance. Results of all the tests are shown in table form.

AM. J. SYPH., GONOR. & VEN. DIS., ST. LOUIS—Con.

Eradication of gonorrhea in a district of Greenland. Poul V. Marcussen and Joergen Rendal. Am. J. Syph., Gonor. & Ven. Dis., 35: 356–360, July 1951.

Experiment was performed to ascertain whether or not it was possible to eradicate gonorrhea in Nanortalik, a population whose form of culture and religion made mass examination and treatment impossible. The area measured about 2,000 square miles with a population of 1,047 persons. It was possible to secure collaboration for the total eradication by examining unmarried women who had previously had the disease, and to follow up the chains of infection leading from the cases discovered. The district was reinfected 3 months later from the neighboring district. From this the authors conclude that endeavors toward total eradication of venereal diseases should commence simultaneously in all districts forming a geographic unit.

Investigation of the cultivation of pleuropneumonia-like organisms from man. Harry E. Morton, Paul F. Smith, and Paul R. Leberman. Am. J. Syph., Gonor. & Ven. Dis., 35: 361–369, July 1951.

Conditions necessary for the propagation of PPLO in order that they might be more readily isolated from clinical material for study in the laboratory were investigated. Infusion prepared from beef heart supported best growth of the eight strains tested. Of the peptones tested, Bacto-peptone and bacteriologic peptone were superior and equally good in promoting growth. A medium with a pH of 7.8 to phenol red before autoclaving gave the maximal amount of growth. When a medium as described in the article was employed, PPLO were isolated from the genito-urinary tract of 20 percent of 80 males and 44.5 percent of 18 females.

Treatment of early lymphogranuloma venereum with aureomycin. Ira L. Schamberg, Orlando M. Carrozzino, and William P. Boger. Am. J. Syph., Gonor. & Ven. Dis., 35: 370–377, July 1951.

Of 24 Negro patients with buboes of early lymphogranuloma venereum treated with oral aureomycin, 8 received 7 gm. in 7 days, while 16 received 20 gm. in 10 days. No marked difference in the results of the two schedules was observed. Two patients were treatment failures. It was concluded that aureomycin is effective and that the response is similar to that observed after prolonged sulfonamide therapy.

Granuloma inguinale: Further observations on results of treatment with aureomycin and chloramphenicol. Raymond C. V. Robinson and Bruce Cronk. Am. J. Syph., Gonor. & Ven. Dis., 35: 378–382, July 1951.

Results are given on treatment of 42 patients treated with 4 different dosage schedules of aureomycin and 16 patients treated with 2 different doses of chloramphenicol. Number of relapses was considerably larger than in other reported series which was possibly due to more prolonged observation. Although the number of patients treated with chloramphenicol was smaller and the period of follow-up shorter, it was the opinion of the writers that this drug gave more rapid healing of early lesions and might eventually yield a higher cure rate than aureomycin.

Antibiotics versus *Donovania granulomatis.* Calvin H. Chen, Robert B. Dienst, and Robert B. Greenblatt. Am. J. Syph., Gonor. & Ven. Dis., 35: 383–392, July 1951.

A strain of *Donovania granulomatis,* isolated from a patient with granuloma inguinale, was used exclusively in the study. Using the method for determining bacteriostatic and bactericidal action of antibiotics or combinations of antibiotics on *D. granulomatis,* as described by the authors, the relative actions of the various antibiotics in order of potency were streptomycin or dihydrostreptomycin, penicillin, aureomycin, Chloromycetin, and bacitracin. The combined effect of any two of the four (streptomycin, penicillin, aureomycin, and Chloromycetin), against *D. granulomatis* is additive, except for the combined bacteriostatic action of streptomycin and aureomycin.

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AM. J. TROP. MED., BALTIMORE

Electronmicrography of treponemas from

cases of yaws, pinta, and the so-called Cuban form of pinta. Juan J. Angulo, John H. L. Watson, C. Courtney Wedderburn, Francisco León-Blanco, and Gerardo Varela. Am. J. Trop. Med., 31: 458–478, July 1951.

In this paper, morphologic and structural findings made with the electron microscope study of treponemes from a Jamaican case of yaws, a Mexican case of pinta, and a Cuban case of the so-called form of pinta are presented. Thirty *Treponema pertenue*, 9 *Treponema carateum*, and 89 *Treponema* sp. specimens were studied. Results showed no differences in morphology or structure among these species or with regard to *Treponema pallidum*, except for the lack of flagella shown by *T. pertenue* specimens which was probably an artifact.

## BULL. WORLD HEALTH ORGAN., GENEVA

Cardiolipin antigens. Bull. World Health Organ., 4: 151–200, No. 2, 1951.

In this paper, prepared by staff members of the Division of Laboratories and Research, New York State Department of Health, preparation methods, reagents and solvents, preliminary extraction and purification of cardiolipin and lecithin, chemical examination, analytical methods, serologic examination, and the New York State Department of Health complement-fixation technic and microscopic slide test for acceptance of new lots of antigen components are discussed.

Chancroid in tropical Africa: Southern Rhodesia and the Gold Coast. Richard R. Willcox. Bull. World Health Organ., 4: 283–290, No. 2, 1951.

Data are presented on the high incidence of chancroid in tropical Africa and discussed in relation to the declining incidence of the disease in other parts of the world. In personal studies in venereal disease clinics at Accra, Gold Coast, and Salisbury, Southern Rhodesia, the author found the frequency of chancroid to be comparatively high, 18 and 26 percent, respectively, of all venereal disease infections encountered.

## CHICAGO M. SOC. BULL., CHICAGO

The evaluation of laboratory tests. Seward E. Miller. Chicago M. Soc. Bull., 53: 987–990, June 9, 1951.

In this paper, delivered before the Annual Clinical Conference of the Chicago Medical Society, March 6, 1951, the author discussed the growth and development of laboratory medicine, shortcomings and morale of the personnel, evaluation studies on accuracy of laboratory technics, and the cost and use of laboratory services. Some of the problems of syphilis serology and steps taken for the improvement of technics were briefly reviewed.

## CHRON. WORLD HEALTH ORGAN., GENEVA

Venereal diseases. Notes and News. Chron. World Health Organ., 5: 171–172, June 1951.

A review of the progress of some of the venereal disease control programs is presented. There has been an increase in clinic attendance in India which brought the total number of patients seen in the first 3 months of 1951 to 1,850. Seven teams are working in the antiyaws campaign in Indonesia. Teams working in Thailand discovered 1,012 cases of yaws among the 6,584 persons examined during the month of February. A statistical report is given on the prenatal and syphilis program in Italy.

## CINCINNATI J. MED., CINCINNATI

The waning problem of syphilis. Roy L. Kile. Cincinnati J. Med., 32: 223–224, June 1951.

Syphilis is on the wane and will never again be a common communicable disease. Savings in cost of management of late syphilis are becoming evident. Emphasis on social hygiene should continue. Large centers are talking of combining their treatment results in order to have enough patients to constitute a series that is statistically significant.

## CONNECTICUT HEALTH BULL., HARTFORD

Screening and early detection of chronic diseases. A. L. Chapman. Connecticut Health Bull., 65: 214–222, July 1951.

Multiple screening is a new administra-

### CONNECTICUT HEALTH BULL., HARTFORD—Con.

tive technic that is designed to make possible increased disease case finding at the lowest possible cost. A description of the project held at Alexandria, Va., is given as an example of how a screening line operates. Multiple screening has a potential value as a health education technic. The laboratory is the hub around which screening revolves.

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### EYE, EAR, NOSE & THROAT MONTHLY, CHICAGO

Penicillin and syphilis of the ear. Marvin J. Tamari and Paul Itkin. Eye, Ear, Nose & Throat Monthly, 30: 252–261, May 1951; 301–309, June 1951; 358–366, 373, July 1951.

After a review of the history of syphilis of the ear, an extensive analysis of results of a study of 310 patients attending the Syphilitic Clinic at Illinois Research and Educational Hospitals and the Chicago Municipal Social Hygiene Clinic is presented. Classification and incidence, evaluation of signs and symptoms, and differential diagnosis are discussed. From the results of this study, the authors feel that there is conclusive evidence that penicillin is more effective in the treatment of syphilitic nerve deafness than has been observed after any previously described treatment.

The dermatoses of the eyelids. Samuel J. Zakon and Aaron L. Goldberg. Eye, Ear, Nose & Throat Monthly, 30: 312–315, 320, June 1951.

A brief general discussion on diagnosis and treatment of the common, less common, and rare types of dermatoses of the eyelids is presented. Syphilis is included among the less common dermatoses. Extragenital chancres, the secondary eruptions, as macules, papules, and pustules, may occur on the eyelids, while gummas are rarely seen on this site.

Penicillin prophylaxis in ophthalmia neonatorum. Louis Lehrfeld. Eye, Ear, Nose & Throat Monthly, 30: 367–370, July 1951.

In this address at a meeting of the American Academy of Pediatrics, April 1, 1950, author discussed the relative merits of 1-percent silver nitrate solution as a prophylactic compared with an aqueous solution of penicillin containing 2,500 units per cubic centimeter. From a review of the literature and results of three surveys conducted at the Philadelphia General Hospital from 1937 to 1950, author concluded that silver nitrate as a prophylactic agent is on the way out.

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### HEALTH BULL., RALEIGH

Venereal Disease Control Section. Departmental Reports. Health Bull., 66: 26–28, June 1951.

Annual report on activities of the North Carolina State Board of Health during 1950 includes a discussion of incidence of venereal diseases, case finding, clinical facilities, North Carolina Syphilis Studies, and publication of various epidemiologic studies.

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### INDIAN J. VEN. DIS., BOMBAY

2nd All India Conference on Dermatology & Venereology—Calcutta. Presidential address. A. C. Rebello. Indian J. Ven. Dis., 17: 40–51, Apr.–June 1951.

The history and development of the sciences of dermatology and venereology from ancient times to the present are reviewed with an emphasis on the progress made in India in recent times.

2nd All India Conference on Dermatology & Venereology—Calcutta. Welcome address. K. K. Chatterjee. Indian J. Ven. Dis., 17: 52–54, Apr.–June 1951.

In this address, the author briefly discussed causes and effects of venereal diseases, as well as control programs of some of the States of India.

2nd All India Conference on Dermatology & Venereology—Calcutta. Inaugural address. K. N. Katju. Indian J. Ven. Dis., 17: 54–57, Apr.–June 1951.

The Governor of Bengal discussed, from the point of view of a layman, the effects of venereal disease on individuals and families. West Bengal is reported to operate 23 venereal disease clinics, where the total attendance during the past 2 years has been over 200,000 each year.

INDIANA J. VEN. DIS., BOMBAY—Con.

Resolutions passed unanimously at the All-India Conference on Dermatology and Venereology held on 14th & 15th April, 1951 at Calcutta. Indian J. Ven. Dis., 17: 58–63, Apr.–June 1951.

Included among the resolutions were the following recommendations: to set up an organization in each State to study the problem of skin and venereal diseases and leprosy from the curative and preventive aspect; start a sufficient number of free clinics for treatment; and begin an educational control program.

Venereal diseases prevention in India. Notes and News. Indian J. Ven. Dis., 17: 69–71, Apr.–June 1951.

An account is presented of the prevalence of venereal diseases in several Provinces of India and the steps taken to combat them.

J. A. M. A., CHICAGO

Diagnostic drifts, deceptions and common misses. M. Pinson Neal. J. A. M. A., 146: 537–541, June 9, 1951.

This is a general discussion of some of the problems a general practitioner may encounter in the diagnosis of various diseases, including syphilis.

Examination and certification of prostitutes. Editorials and Comments. J. A. M. A., 146: 564, June 9, 1951.

A review is presented of the reasons which led the House of Delegates of the American Medical Association to condemn as unethical the practice of those few physicians who continue periodically to examine prostitutes and provide them with certificates implying freedom from venereal diseases.

Prenatal prophylaxis of congenital syphilis. Norway. Foreign Letters. J. A. M. A., 146: 956–957, July 7, 1951.

Because of the number that escape detection for want of evidence of syphilis during the first few months of life, the 70 to 80 notifications of congenital syphilis each year in Norway since 1943 have been an underestimate. Penicillin alone is being used as a prenatal prophylaxis. Schedule consists of injections of procaine penicillin G in oil and 2 percent aluminum monostearate.

Syphilis control. Editorial. J. A. M. A., 146: 1031–1032, July 14, 1951.

Data indicate that there has been a steady decrease in the incidence of syphilis in Europe and the United States for almost a century and that the decline has been interrupted only by temporary increases during wars and periods of civil unrest. Improvement in socioeconomic conditions has contributed to the reduction in the incidence. Observations suggest that a gradual process of adaptation has led to a decrease in the virulence of the parasite or an increase in the resistance of the host.

J. AM. M. WOMEN'S A., NASHVILLE

Non-venereal treponematosis. A world health problem of underprivileged children. Frank W. Reynolds and Thorstein Guthe. J. Am. M. Women's A., 6: 251–254, July 1951.

A global view of the treponematoses brings an increased appreciation of the fact that the treponemal diseases are often nonvenereal in their method of spread and frequently are diseases of childhood rather than of the sexually active adult. The common denominator in all these nonvenereal treponematoses is an underdeveloped socioeconomic state. Through organizations such as WHO and UNICEF, nations advanced in technical skills and rich in resources can share these skills and resources with less fortunate nations.

J. ARKANSAS M. SOC., FORT SMITH

Proceedings, seventy-fifth annual session Arkansas Medical Society. Public Health Committee. J. Arkansas M. Soc., 48: 19–21, June 1951.

Arkansas is experiencing the lowest venereal disease rate in its history. All venereal diseases from all reporting sources totaled approximately 17,881 cases in 1949; in 1950, 12,402. These totals as against 24,442 cases reported in 1948 indicate progress in control. A basic public health law requiring a premarriage blood test for syphilis would aid in further reducing the over-all State venereal disease rate.

J. CLIN. INVESTIGATION, CINCINNATI

Effectiveness of a new compound, Benemid, in elevating serum penicillin concentrations. James M. Burnell and William M. M. Kirby. J. Clin. Investigation, 30 : 697–700, July 1951.

The effect of oral administration of 0.5 gm. of Benemid every 6 hours on serum penicillin levels was measured in 74 patients. In 51 patients treated with procaine penicillin, there was enhancement of penicillin levels following Benemid in 81 percent of the instances. In 23 patients treated with crystalline penicillin, the levels were higher in 96 percent. Benemid may find an important place in conjunction with oral penicillin therapy.

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J. DENT. RESEARCH, INDIANAPOLIS

Isolation of pleuropneumonia- like organisms from human saliva : a newly detected member of the oral flora. Harry E. Morton, Paul F. Smith, Ned B. Williams, and Charles F. Eickenberg. J. Dent. Research, 30 : 415–422, June 1951.

After a review of the literature, the authors report on a study in which pleuropneumonia-like organisms were found in the saliva of 46 of 100 individuals tested. Of 60 female subjects cultured, 28 (46.6 percent) were positive for the organisms, while of 40 male subjects, 18 (45 percent) were positive. This is the first report of the finding of these organisms in high incidence in a region of the human body outside of the genito-urinary tract.

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J. IMMUNOL., BALTIMORE

Studies on treponemal immobilizing antibodies in syphilis. I. Techniques of measurement and factors influencing immobilization. Robert A. Nelson, Jr., and Judith A. Diesendruck. J. Immunol., 66 : 667–685, June 1951.

In these studies conducted at the Johns Hopkins University School of Hygiene and Public Health, five pools of syphilis serum and four individual syphilis serums were examined in twofold dilutions. The results of these experiments indicated that the titer of treponemal immobilizing antibody in syphilis serum may be determined by measuring the serum dilution which produces immobilization of 50 percent of the treponemes after 18 hours incubation at 35° C.

Serological epidemiology: antibody patterns in North Alaskan Eskimos. John R. Paul, John T. Riordan, and Lisbeth M. Kraft. J. Immunol., 66 : 695–713, June 1951.

A series of antibody determinations, carried out for epidemiologic purposes on 242 blood samples covering a wide age distribution and collected from a semiremote Eskimo colony on the north coast of Alaska, are described. Two hundred and fifty serums, subjected to both Mazzini flocculation and VDRL tests for syphilis, showed negative results.

Heterologous strain immunity in experimental syphilis. Harold J. Magnuson and Frederick A. Thompson, Jr. J. Immunol., 67 : 35–40, July 1951.

In this study, three strains of *Treponema pallidum*, the Nichols strain, and two recently isolated from patients, designated 20A and 20B, were used both for the initial immunizing and for the challenging infections. Results indicated that acquired immunity to heterologous strains of *T. pallidum* developed following a previously treated 3-month-old infection and the degree of protection conferred by the more virulent Nichols strain was greater than that afforded by the less virulent strains 20A and 20B.

Relationship between treponemal immobilizing antibodies and acquired immunity in experimental syphilis. Harold J. Magnuson, Frederick A. Thompson, Jr., and Charlotte P. McLeod. J. Immunol., 67 : 41–48, July 1951.

This paper described results of the treponemal immobilization test on serums from rabbits whose immune status had been established by suitable challenge infection. The experiments showed that measurement of circulating "immobilizing antibody" proved to be a poor measure of the resistance of immune rabbits to challenge infection with three strains of *Treponema pallidum*. During the early stages of the immunizing infection, when both immunity and the development of immobilizing antibodies can be correlated with time, a crude correlation between the results of the immobilization test and immunity was demonstrated. The in vitro immobilization test did not show strain differences among the three strains of *T. pallidum.*

J. INVEST. DERMAT., BALTIMORE

The gamma globulins in some diseases of the skin. Theodore Cornbleet and J. de la Huerga. J. Invest. Dermat., 16 : 401–405, June 1951.

A new turbidimetric procedure for estimating serum gamma globulin is described, this method being relatively easy and taking much less time than the standard electrophoretic method. The results are presented for patients with various infections of the skin, including one with granuloma inguinale and one with lymphogranuloma venereum. In lymphogranuloma venereum and granuloma inguinale it was found that gamma globulin values return rapidly to normal levels with the newer antibiotic drugs.

J. KENTUCKY M. A., BOWLING GREEN

The use and abuse of cerebrospinal fluid. Ephraim Roseman. J. Kentucky M. A., 49 : 281–285, July 1951.

Indications and contra-indications for spinal puncture, cerebrospinal fluid dynamics, collection, cytology, chemical analysis, serology and colloidal gold reaction, and normal findings in cerebrospinal fluid are discussed. Whenever possible, routine spinal fluid should be collected in at least three tubes, with the Wassermann (Kolmer or Kahn) and colloidal gold tests being done on tube 3 and usually requiring 4 to 5 cc.

J. LAB. & CLIN. MED., ST. LOUIS

The precipitation of cerebrospinal fluid globulin by zinc sulfate, Alfred M. Donovan, Joseph M. Foley, and William C. Moloney. J. Lab. & Clin. Med., 37 : 374–381, Mar. 1951.

This is a preliminary report on an easily standardized and simple zinc reaction which precipitates protein from cerebrospinal fluid. The test has been used to date on over 1,000 samples of cerebrospinal fluid, including those from 37 cases of neurosyphilis. The authors found that this precipitation reaction showed a high degree of correlation with neurosyphilis and multiple sclerosis.

J. OKLAHOMA M. A., OKLAHOMA CITY

Cutaneous manifestations of certain systemic diseases. Robert R. Kierland. J. Oklahoma M. A., 44 : 219–224, June 1951.

Physicians are urged to make use of the State-provided laboratory facilities for serodiagnosis or confirmation of the diagnosis of syphilis when a patient presents a cutaneous lesion or lesions not specific for some other disorder. The type of syphilitic lesion in an individual depends entirely upon his immune or allergic state. If early diagnosis is overlooked the delay may result in serious irreversible sequelae.

J. PHARM. & PHARMACOL., LONDON

New antibiotics. Chloramphenicol, aureomycin, terramycin and neomycin. E. P. Abraham. J. Pharm. & Pharmacol., 3 : 257–270, May 1951.

An extensive review of the literature is presented. Production, chemical, pharmacologic, and antimicrobial properties, and the use of these drugs in the treatment of various infections, including the venereal diseases, are discussed.

J. ROY. ARMY M. CORPS, LONDON

Hyperthermy by electric blanket. R. R. Willcox and W. A. Flynn. J. Roy. Army M. Corps, 96 : 350–354, June 1951.

The technic of hyperthermy by means of electric blankets is described. Records of 12 patients treated with 17 fever sessions were recorded and studied. Because of disappointing clinical results and one alarming case of hyperpyrexia, treatment was abandoned. Such a method of treatment is not likely to play any part in the present-day treatment of venereal diseases.

J. ROY. SAN. INST., LONDON

Modern tendencies in the treatment and prevention of mental illness. William Ogden. J. Roy. San. Inst., 71 : 201–208, May 1951.

J. Roy. San. Inst., London—Con.

In this general discussion on advances in treatment of mental diseases, treatment of general paralysis with malaria and penicillin is briefly reviewed. In view of the thoroughness with which venereal disease was followed up and treated in the services during the recent war, the author does not foresee any increase in the number of cases of general paralysis such as followed the 1914–18 war.

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J. Social Hyg., New York

Social treatment of the sexually promiscuous. Thomas E. Connolly. J. Social Hyg., 37 : 260–273, June 1951.

The prevention of sexual promiscuity, the source of venereal disease, and the redirection of the sexually promiscuous are the responsibilities of the police, health, welfare, and other agencies concerned with the well-being of people. A community with adequate preventive and protective programs in its schools, law enforcement agencies, recreation facilities, and other institutions can do much to prevent sexual promiscuity.

The police role in contact investigation. Five years' experience with the Boston Police Department. Nicholas J. Fiumara. J. Social Hyg., 37 : 274–279, June 1951.

How a modern and socially minded police department can render assistance to the health officer is shown in this article. The venereal disease control officer should not be satisfied with an unsuccessful epidemiologic investigation of a case of venereal disease until every resource in the community has been exhausted. During a 5-year period, 19.7 percent of the contacts referred to the police department were identified and located.

How VD contact interviewers break down the "No" patient. Herman Goodman. J. Social Hyg., 37 : 280–284, June 1951.

Since the venereal disease nurse meets resistance in her interviewing and finds more "No" than "Yes" people, she must be a salesman to get information from a patient who persists in answering "No" to all questions. The 25 types of "No" responses and ways to deal with them are presented.

# STATISTICS

## Clinic and Epidemiologic Data Reported to the Public Health Service by State and Territorial Health Departments, Fiscal Years 1947–51

| | 1947 | 1948 | 1949 | 1950 | 1951 [a] |
|---|---|---|---|---|---|
| Diagnostic examinations in public clinics | 1,764,045 | 2,328,002 | 2,276,957 | 2,717,707 | 2,532,221 |
| Percent of examinations in which 1 or more cases of venereal disease were found | 29.8 | 21.0 | 20.3 | 15.7 | 14.8 |
| Number of previously untreated syphilis cases found per 100 patients examined | 9.3 | 6.7 | 5.7 | 3.9 | 3.5 |
| Number of previously untreated primary-secondary syphilis cases found per 100 patients examined | 3.2 | 1.9 | 1.3 | .7 | .4 |
| Percent of early syphilis cases discovered sent to a rapid treatment center for treatment | 61.0 | 65.5 | 57.4 | 50.1 | 37.50 |
| Number of contact investigations completed | 476,368 | 408,054 | 381,464 | 339,966 | 314,567 |
| Number of other suspect investigations completed | 177,169 | 164,003 | 154,339 | 148,563 | 149,550 |
| Approximate number of contacts obtained per primary and secondary syphilis patient | 1.83 | 2.31 | 2.58 | 2.72 | 3.00 |
| Approximate number of syphilis infections identified by contact investigation per primary and secondary syphilis patient | .56 | .71 | .75 | .67 | .68 |
| Approximate number of syphilis infections brought to treatment through contact investigation per primary and secondary syphilis patient | .31 | .38 | .42 | .40 | .37 |
| Approximate number of primary and secondary syphilis cases brought to treatment through contact investigation per primary and secondary syphilis patient | .16 | .17 | .20 | .19 | .17 |

[a] Fiscal 1951 data are provisional.

Source: Quarterly Venereal Disease Control Activity Report (PHS—Form 724) and Special Semiannual Tabulations of Contact Investigation Data, September 20, 1951 (MC–WFU) mdp.

## Cases of Venereal Disease Reported to the Public Health Service by State and Territorial Health Departments, by Disease and Stage, Fiscal year 1951

[Known military cases excluded]

| Federal Security Agency regions | Syphilis | | | | | | Gonorrhea | Chancroid | Granuloma inguinale | Lympho-granuloma venereum |
|---|---|---|---|---|---|---|---|---|---|---|
| | Total | Primary and secondary | Early latent | Late and late latent | Congenital | Not stated | | | | |
| Region 1—Total | 3, 526 | 419 | 669 | 2, 061 | 222 | 155 | 3, 002 | 23 | 3 | 12 |
| Connecticut | 838 | 76 | 315 | 362 | 41 | 44 | 697 | 9 | 2 | 5 |
| Maine | 321 | 85 | 52 | 160 | 24 | 0 | 237 | 2 | 0 | 0 |
| Massachusetts | 1, 360 | 187 | 205 | 873 | 95 | 0 | 1, 724 | 12 | 1 | 5 |
| New Hampshire | 184 | 10 | 12 | 137 | 23 | 2 | 76 | 0 | 0 | 2 |
| Rhode Island | 648 | 14 | 61 | 443 | 26 | 104 | 181 | 0 | 0 | 0 |
| Vermont | 175 | 47 | 24 | 86 | 13 | 5 | 87 | 0 | 0 | 0 |
| Region 2—Total | 39, 371 | 2, 180 | 8, 259 | 27, 224 | 1, 268 | 440 | 32, 293 | 342 | 130 | 242 |
| Delaware [a] | 598 | 53 | 196 | 184 | 28 | 137 | 236 | 1 | 2 | 1 |
| New Jersey | 5, 173 | 287 | 1, 551 | 3, 080 | 231 | 24 | 3, 940 | 21 | 10 | 18 |
| New York | 26, 173 | 1, 165 | 3, 964 | 20, 101 | 694 | 249 | 18, 415 | 232 | 90 | 184 |
| Pennsylvania [a] | 7, 427 | 675 | 2, 548 | 3, 859 | 315 | 30 | 9, 702 | 88 | 28 | 39 |
| Region 3—Total | 28, 030 | 2, 923 | 9, 696 | 12, 275 | 2, 817 | 319 | 52, 710 | 857 | 193 | 218 |
| District of Columbia | 3, 278 | 82 | 917 | 2, 203 | 70 | 6 | 12, 542 | 321 | 32 | 53 |
| Maryland | 3, 850 | 385 | 991 | 2, 083 | 206 | 185 | 7, 462 | 154 | 36 | 19 |
| North Carolina | 4, 595 | 891 | 2, 210 | 1, 125 | 369 | 0 | 13, 667 | 227 | 68 | 74 |
| Virginia | 5, 211 | 741 | 1, 769 | 2, 354 | 245 | 102 | 9, 223 | 97 | 47 | 63 |
| West Virginia | 2, 615 | 392 | 632 | 1, 421 | 170 | 0 | 2, 975 | 17 | 3 | 0 |
| Puerto Rico | 8, 357 | 419 | 3, 108 | 3, 054 | 1, 753 | 23 | 6, 774 | 40 | 7 | 9 |
| Virgin Islands[a] | 124 | 13 | 69 | 35 | 4 | 3 | 67 | 1 | 0 | 0 |
| Region 4—Total | 24, 183 | 1, 476 | 6, 154 | 12, 737 | 1, 196 | 2, 620 | 20, 951 | 296 | 40 | 37 |
| Kentucky | 2, 908 | 310 | 656 | 1, 600 | 318 | 24 | 3, 886 | 25 | 5 | 9 |
| Michigan | 8, 494 | 559 | 1, 899 | 3, 922 | 277 | 1, 837 | 8, 644 | 215 | 18 | 17 |
| Ohio | 12, 781 | 607 | 3, 599 | 7, 215 | 601 | 759 | 8, 421 | 56 | 17 | 11 |
| Region 5—Total | 16, 859 | 1, 793 | 4, 147 | 9, 852 | 770 | 297 | 24, 572 | 571 | 22 | 76 |
| Illinois | 10, 529 | 1, 206 | 2, 804 | 6, 109 | 410 | 0 | 20, 749 | 550 | 22 | 73 |
| Indiana | 3, 770 | 334 | 982 | 2, 202 | 252 | 0 | 2, 373 | 17 | 0 | 3 |
| Minnesota [a] | 586 | 50 | 85 | 421 | 17 | 13 | 724 | 0 | 0 | 0 |
| Wisconsin | 1, 974 | 203 | 276 | 1, 120 | 91 | 284 | 726 | 4 | 0 | 0 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Region 6—Total | 42, 790 | 4, 941 | 13, 037 | 18, 871 | 4, 295 | 1, 646 | 70, 575 | 1, 560 | 920 | 403 |
| Alabama | 5, 979 | 604 | 1, 872 | 1, 596 | 330 | 1, 577 | 3, 593 | 120 | 50 | 31 |
| Florida | 10, 494 | 1, 301 | 3, 739 | 4, 971 | 483 | 0 | 13, 368 | 299 | 443 | 30 |
| Georgia | 7, 612 | 1, 340 | 2, 008 | 3, 161 | 1, 103 | 0 | 14, 258 | 782 | 234 | 201 |
| Mississippi | 8, 531 | 682 | 1, 631 | 4, 812 | 1, 406 | 0 | 11, 502 | 143 | 65 | 85 |
| South Carolina | 4, 754 | 465 | 2, 344 | 1, 632 | 313 | 0 | 7, 738 | 75 | 85 | 18 |
| Tennessee | 5, 420 | 549 | 1, 443 | 2, 699 | 660 | 69 | 20, 116 | 141 | 43 | 38 |
| Region 7—Total | 10, 765 | 1, 180 | 2, 593 | 5, 975 | 580 | 437 | 7, 306 | 66 | 12 | 17 |
| Iowa | 1, 853 | 259 | 377 | 1, 052 | 108 | 57 | 767 | 2 | 2 | 0 |
| Kansas | 2, 168 | 211 | 468 | 1, 350 | 109 | 30 | 1, 248 | 5 | 0 | 2 |
| Missouri | 5, 456 | 577 | 1, 425 | 2, 943 | 298 | 213 | 4, 337 | 57 | 9 | 15 |
| Nebraska | 803 | 62 | 160 | 427 | 37 | 117 | 633 | 2 | 1 | 0 |
| North Dakota | 252 | 27 | 82 | 111 | 14 | 18 | 104 | 0 | 0 | 0 |
| South Dakota | 233 | 44 | 81 | 92 | 14 | 2 | 217 | 0 | 0 | 0 |
| Region 8—Total | 27, 744 | 2, 480 | 8, 039 | 12, 205 | 2, 889 | 2, 131 | 43, 176 | 537 | 301 | 212 |
| Arkansas | 5, 729 | 420 | 1, 701 | 3, 020 | 588 | 0 | 3, 518 | 55 | 24 | 43 |
| Louisiana | 9, 192 | 709 | 2, 372 | 4, 102 | 1, 159 | 850 | 10, 163 | 285 | 222 | 94 |
| New Mexico | 965 | 100 | 385 | 398 | 82 | 0 | 632 | 3 | 0 | 1 |
| Oklahoma | 2, 708 | 252 | 587 | 1, 680 | 180 | 9 | 4, 910 | 65 | 6 | 11 |
| Texas | 9, 150 | 999 | 2, 994 | 3, 005 | 880 | 1, 272 | 23, 953 | 129 | 49 | 63 |
| Region 9—Total | 1, 454 | 198 | 335 | 747 | 91 | 83 | 1, 807 | 17 | 2 | 1 |
| Colorado [a] | 661 | 106 | 150 | 358 | 46 | 1 | 1, 077 | 6 | 1 | 0 |
| Idaho | 280 | 19 | 65 | 182 | 9 | 5 | 350 | 10 | 1 | 0 |
| Montana | 187 | 36 | 54 | 73 | 8 | 16 | 185 | 0 | 0 | 0 |
| Utah | 130 | 22 | 18 | 41 | 15 | 34 | 92 | 1 | 0 | 1 |
| Wyoming | 196 | 15 | 48 | 93 | 13 | 27 | 103 | 0 | 0 | 0 |
| Region 10—Total | 13, 107 | 1, 105 | 2, 704 | 8, 701 | 539 | 58 | 22, 141 | 506 | 24 | 127 |
| Arizona | 1, 508 | 190 | 540 | 710 | 68 | 0 | 1, 449 | 10 | 2 | 1 |
| California | 9, 789 | 751 | 1, 839 | 6, 794 | 375 | 30 | 17, 359 | 343 | 19 | 121 |
| Nevada | 361 | 24 | 37 | 276 | 24 | 0 | 222 | 7 | 0 | 1 |
| Oregon | 387 | 47 | 90 | 233 | 17 | 0 | 694 | 23 | 1 | 1 |
| Washington | 660 | 68 | 114 | 440 | 22 | 16 | 1, 573 | 121 | 2 | 3 |
| Alaska | 104 | 19 | 39 | 38 | 3 | 5 | 471 | 0 | 0 | 0 |
| Hawaii | 298 | 6 | 45 | 210 | 30 | 7 | 373 | 2 | 0 | 0 |
| Canal Zone | 333 | 34 | 62 | 228 | 6 | 3 | 754 | 19 | 1 | 0 |
| Total continental United States [a] | 198, 946 | 18, 238 | 52, 372 | 107, 311 | 12, 877 | 8, 148 | 270, 848 | 4, 732 | 1, 640 | 1, 336 |
| Total United States including Territories [a] | 208, 162 | 18, 729 | 55, 695 | 110, 876 | 14, 673 | 8, 189 | 279, 287 | 4, 794 | 1, 648 | 1, 345 |

[a] Provisional.

Source: PHS Form 688 FSA-PHS—Division of Venereal Disease, Office of Statistics, 9/18/51 (ML-BBM) mdp.

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ORIGINAL ARTICLES

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FEDERAL SECURITY AGENCY
Public Health Service

FEDERAL SECURITY AGENCY
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# Editorial

After 32 years of continuous publication, The Journal of Venereal Disease Information ends as a separate Public Health Service periodical with this issue. During its existence, The Journal has presented a current chronicle of the dramatic progress that has been made in venereal disease control.

The Journal's readers have followed the course of many scientific developments in research, treatment, and epidemiology that have served to advance control of the venereal diseases to the point where total syphilis morbidity in the United States has reached an all-time low.

The many reports on the diagnosis, treatment, and management of syphilis, gonorrhea, and the other venereal diseases published in The Journal in the last three decades have played an important part in enlisting medical and lay support of venereal disease control both in this country and abroad.

The evaluative studies of serologic testing practices and of various therapy schedules reported periodically have served to standardize many control procedures now used in this country and have influenced many programs existing abroad.

The history of The Journal of Venereal Disease Information has been one of growth and influence. This periodical was first published in January 1920 under the editorship of Assistant Surgeon General C. C. Pierce, then Chief of the Division of Venereal Disease. Originally titled "Abstracts from Recent Medical and Public Health Papers," the publication was a mimeographed monthly bulletin averaging 6 to 7 pages of abstracts of articles appearing in current periodical literature on venereal diseases. It was distributed to about 250 physicians, nurses, and health workers who requested it.

Within 2 years the publication's title was changed to "Venereal Disease Information" and The Journal was expanded to 31 pages to include original articles as well as abstracts. In 1923, Assistant Surgeon General Mark J. White, Chief of the Division and editor, had the publication printed at the Government Printing Office for the first time and in new format. Special articles on research, diagnosis, treatment, clinical notes, and public health administration notes gave The Journal a broad content. With this growth came an increase in circulation and more than 4,000 copies were distributed each month.

When Dr. Thomas Parran became Chief of the Division and editor in 1926, The Journal served as an important instrument in shaping policies of close cooperation with State health departments which have become standard in the operation of the present control program. During his editorship, emphasis on prevention and research was increased and many original articles that gained wide attention were offered to the readers of THE JOURNAL. The demand for THE JOURNAL had grown to the point where in 1927 it had a paid subscription list in excess of 10,000 copies per issue, which was then the largest paid circulation of any government subscription publication.

The Cooperative Clinical Study reports which appeared in THE JOURNAL during the decade 1932–42 were instrumental in reconciling many differences of opinion on treatment methods among the medical professional groups both in this country and abroad.

The series of reports entitled "Untreated Syphilis in the Male Negro," which have been published periodically in THE JOURNAL since 1936 also have drawn considerable attention. The reports have charted the progress made in a study that was started in Macon County, Ala., in 1931, and which still is being conducted by the Division of Venereal Disease.

Supplements to THE JOURNAL have become generally used reference works among medical students and physicians in venereal disease control activity.

The report of the first treatment of early syphilis with penicillin was made in THE JOURNAL in December 1943, by Dr. J. F. Mahoney, Dr. R. C. Arnold, and Ad Harris. "Penicillin Treatment of Early Syphilis: A Preliminary Report" and subsequent reports by these authors are of classical importance in the field of medicine.

In the last several years, THE JOURNAL has reached more than 16,000 subscribers each month in this country and abroad, including among them physicians, nurses, technicians, public health workers, and an average of 3,000 senior students in the accredited medical schools of the United States.

THE JOURNAL has had a tradition of service to the professional workers in the field of venereal disease control. It was built up and strengthened by a succession of editors whose influence has been greatly responsible for the gains that have been made thus far in venereal disease control both nationally and internationally. In addition to those already mentioned they include: Dr. Taliaferro Clark, Dr. John McMullen, Dr. R. A. Vonderlehr, and Dr. John R. Heller, Jr.

In keeping with this tradition of reporting to professional workers in the field the latest developments in venereal disease control, it is fitting that this final issue should carry a report on the results of the first 5 years of a study to evaluate antisyphilitic therapy with intensive follow-up. The study has been a combined project of the Division of Venereal Disease and the cooperating treatment facilities in various States and we greatly appreciate the time and energy that many individuals have devoted to accomplishing it.

Merger of this JOURNAL with the new *Public Health Reports* certainly does not imply any relaxation of activity by the Public Health Service in its efforts to control venereal disease. On the contrary, this merger represents a determined effort to broaden the base of the control program—to bring venereal disease needs and problems to a wider group of professional persons and to stimulate an understanding of venereal disease control as a basic element in public health administration.

Current developments in research, treatment, and epidemiology in venereal disease control will continue to be reported in the new *Public Health Reports* and other Public Health Service and Divisional publications.

There still is a long road ahead before control of venereal disease can be reached, and we are confident that the new *Public Health Reports* will stand—as this JOURNAL has stood for 32 years—as a symbol of an enlightened, aggressive approach to the control of the venereal diseases.

As Editor, I wish to express our great appreciation of the genuine interest you subscribers have shown in THE JOURNAL and the contributions that you have made to it over the years. I am certain that with the same kind of interest and cooperation *Public Health Reports* can become an important tool in venereal disease control.

THEODORE J. BAUER, *Medical Director,*
*Chief, Division of Venereal Disease.*

## Announcement

In January of 1952 THE JOURNAL OF VENEREAL DISEASE INFORMATION will be merged with two other technical periodicals of the Public Health Service. The material previously covered in these publications will be embodied in the new and expanded monthly version of *Public Health Reports.*

The merger has come about as the result of an extensive study of the Public Health Service's publishing activities. The new journal is designed to carry out more efficiently and economically the responsibilities of the Public Health Service for disseminating scientific information on matters of health.

The new *Public Health Reports* will be concerned with the technical and professional aspects of public health practice and research, and with problems of health administration and research in this field. It will include, as well, substantially the same kind of material that has been appearing in THE JOURNAL OF VENEREAL DISEASE INFORMATION. The "Current Literature" section, however, will be published separately.

As has been true with THE JOURNAL, the pages of the new *Public Health Reports* will be open, on merit, to any responsible author. General editorial guidance will be provided by a Board of Editors composed of individuals of recognized competence and professional stature drawn from both within and without the Federal service.

Every effort will be made to furnish the new *Public Health Reports* to representative organizations in public health and its related fields. Most of the readers on our present free mailing list are affiliated with organizations to which free distribution can legally be made. They will continue to receive the new journal either directly or through these organizations.

The first issue of the new *Public Health Reports* and an application form for a free subscription will be sent to readers now on the free lists for technical periodicals. After they have had an opportunity to review the new *Public Health Reports* and to consider its usefulness in their work, readers who wish to remain on the lists and receive the new periodical regularly should complete the application and send it in as soon as possible. This will allow time to revise the lists for mailing the second and subsequent issues.

The new *Public Health Reports* also will be available by paid subscription from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. Current subscribers to THE JOURNAL OF VENEREAL DISEASE INFORMATION will hear from the Superintendent of Documents concerning their present subscriptions within a short time.

# Evaluation of Antisyphilitic Therapy With Intensive Follow-up

## I. The Plan

Theodore J. Bauer, M. D.[1]

In December 1945, the United States Public Health Service and cooperating treatment facilities initiated a study to evaluate the long-term effectiveness of penicillin in the treatment of syphilis.

More specifically, the objective of the study was to evaluate the efficacy of penicillin in two respects: as a means of preventing infectious or serologic relapses in syphilis patients; and as a means of preventing late, crippling complications of syphilis, and deaths from this disease. Generally known as the Blue Star Study, this investigation undertook to meet a need for an evaluation of penicillin treatment of syphilis, based on complete follow-up information. Accordingly, a fundamental part of the study plan was its goal of careful posttreatment observation of 100 percent of a selected-patient group.

The difficulty of holding patients to observation for a sufficient time after treatment has been one of the major problems in evaluating penicillin therapy for syphilis. Widespread concern has been felt as to the accuracy of conclusions regarding treatment schedules where posttreatment observation has been obtained on only 30 to 70 percent of patients for a period of 1 to 2 years. Results achieved with a schedule under study necessarily have been based on the number of patients remaining under observation at given times, regardless of what percentage of the group treated this number represents. Conclusions as to the effectiveness of the schedule have been based on the assumption that patients who lapse from observation have the same experience as those who remain under observation (*1*). The study under discussion here afforded an opportunity to test this assumption as well as to answer the question of the long-term efficacy of penicillin in the treatment of syphilis.

The following treatment facilities are participating in the study: Mid-South Medical Center, Birmingham, Ala.; City Clinics of San Francisco, Oakland, and Richmond, Calif.; Gallinger Hospital and Polk Health Center, Washington, D. C.; Chicago Intensive Treatment Center, Chicago, Ill.; Delgado Memorial Hospital, New Orleans, La.; Midwestern Medical Center, St. Louis, Mo.; Bellevue Hosiptal, New York, N. Y.; City Health Department, Charlotte, N. C. (formerly at the Western Medical Center, now closed); Eastern Medical Center, Durham, N. C.; City Health Department, Norfolk, Va. (formerly at the Hampton Roads Medical Center, now closed); and the West Virginia Medical Center, South Charleston, W. Va. Eight other treatment facilities participated in the study but have dropped out because the facility closed or because the number of cases for selection was too small to warrant continued participation.

### Follow-up Procedures

When the study was planned, improvements in the usual method of follow-up appeared necessary. Normally, patient follow-up for the purpose of evaluating treatment of syphilis is nonselective; that is, all patients treated on a schedule are included in the evaluation. Frequently, patients do not live in the community where the treating facility is located, and follow-up must be conducted through local clinics. While under treatment, the

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[1] Medical Director, Chief, Division of Venereal Disease, U. S. Public Health Service.

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patient is instructed as to the importance of receiving regular posttreatment physical examinations and serologic tests, either at the treating facility or the local clinic. After treatment, form letters are sent to the patient urging continued observation and reminding him when examinations are due. Letters also are sometimes sent to the local health department in whose jurisdiction the patient resides. Because only 30 to 70 percent of patients are kept under observation for 1 to 2 years through these procedures, a more effective method had to be devised if the goal of 100-percent follow-up was to be approached. The method adopted included the following measures: selection of treating facilities, selection of patients, and personal contact of the treating facility with the patient through a "research investigator."

The participating treatment centers were selected because they could provide an adequate number of research patients residing within approximately 25 miles of the center. Proximity of the patient's home to the treating facility is an obvious advantage in the follow-up process. Facilities were chosen in different geographic areas in order to give representation to various levels of syphilis prevalence.

Selection of patients for the study is the joint responsibility of the medical officer in charge of the facility and the research investigator assigned to it. When patients are chosen, various factors are weighed which may affect the quality of follow-up. Among these factors are the patient's residential stability, his personality and intelligence, and his stated willingness to cooperate in the study for at least five posttreatment years. Tentative selections are made before one of the research schedules is administered. Final selection is made before the patient is discharged from the treatment center.

A research investigator assigned to each of the facilities is responsible for having selected patients report for all scheduled observations. The methods used by investigators are described on page 375 of this issue.

### *Periodicity and Type of Follow-up*

Posttreatment measures employed in the study are as follows:

1. Blood specimens are taken for quantitative test before therapy, at 21 days after the beginning of therapy, and monthly thereafter for the first year; at 15, 18, 21, and 24 months; then semiannually thereafter through the fifth year. Annual observations are made after the fifth year. Where re-treatment becomes necessary, the above schedule of serologic examinations is begun again after re-treatment.

2. Spinal fluid examinations are made before or during treatment and at the twelfth, twenty-fourth (not required after January 1949, if spinal fluid is negative at the twelfth month), and sixtieth months. If the result of the pretreatment test is positive, an additional test is performed at the sixth month.

3. Physical examinations are performed by a physician at each scheduled visit except in unusual circumstances. This examination includes, as a minimum, a careful inspection of the mouth, skin, and genitalia for detection of possible mucocutaneous relapse or reinfection. A complete examination is planned after the fifth posttreatment year, to detect any late manifestations which may have appeared.

4. At the death of any patient, an autopsy is obtained if possible.

5. Additional tests and examinations may be made at the discretion of the medical officer in charge of the treating facility.

## Treatment Schedules

During the early phase of the study, patients having syphilis in the following categories were acceptable for inclusion in the study: primary and secondary with positive-darkfield examination and no previous treatment for syphilis; latent; neurosyphilis; and congenital syphilis. Since 1948, the study has been limited to darkfield-positive secondary syphilis with no previous antisyphilitic therapy.

**Table 1**

| Total units of penicillin | Vehicle | Dosage and Frequency | Duration (days) |
|---|---|---|---|
| 1. 3,400,000 | Aqueous | 40,000 units every 2 hours | 7 |
| 2. 3,000,000 | Oil and beeswax | 300,000 units daily | 10 |
| 3. 3,000,000 | Oil and beeswax | 600,000 units daily | 5 |
| 4. 2,400,000 | Oil with 2 percent aluminum monostearate. | Given in 1, 2, or 4 sites—single session | |
| 5. 4,800,000 | Oil with 2 percent aluminum monostearate. | Given in 2 or 4 sites—single session | |

This study was begun about 6 months before the end of the amorphous penicillin era, a time when disappointment was being expressed in the results of penicillin therapy for syphilis. The tendency was to lengthen schedules rather than to shorten them. For this reason, the first schedules used in the study extended over 14 days, approximately 5 days longer than treatment schedules commonly employed at that time. These schedules were as follows:

1. A total of 2,800,000 units of aqueous penicillin, given 25,000 units every 3 hours for 14 days. One group of patients received penicillin alone; a second group received, in addition to penicillin, 1 mg. per kilogram of body weight (maximum 60 mg.) of arsenoxide on the first, fourth, seventh, tenth, and thirteenth days, and 200 mg. of oil-insoluble bismuth on the first, seventh, and thirteenth days.

2. A total of 4,200,000 units of penicillin in oil and beeswax (POB), given 300,000 units daily for 14 days. One group of patients was treated with penicillin alone, the other with conjunctive arsenoxide and bismuth as above.

Crystalline penicillin G also was used in these schedules.

Later, interest centered on shorter schedules, particularly those which would be practicable for use on an out-patient basis. These schedules, all utilizing crystalline penicillin G, are summarized in table 1.

### *Criteria and Schedules for Re-treatment*

Until January 1949, regardless of which of the treatment schedules had been administered originally, each research patient who required re-treatment received a total of 5,600,000 units of aqueous penicillin, given 33,333 units every 2 hours for 14 days and, provided there were no contraindications, conjunctive arsenoxide and bismuth as in the earlier schedules. Since January 1949, the arsenoxide and bismuth have been omitted; and, if inpatient care is not feasible, the treating facility may use its usual treatment schedules with double dosages. The latter schedules usually employ procaine penicillin G with 2 percent aluminum monostearate.

Certain criteria for re-treatment have been defined in order to promote uniformity among facilities participating in the study. Although all specialists in syphilology may not agree on the details, these criteria provide a necessary common basis for re-treatment accepted by the cooperating treatment facilities.

*Clinical manifestations.*—Re-treatment is indicated for any patient who exhibits darkfield-positive mucocutaneous lesions at any time after treatment, or who, in the absence of a positive darkfield, exhibits suspicious mucocutaneous lesions accompanied by a confirmed two-tube rise in serologic titer.

*Serologic manifestations.*—Re-treatment is indicated as follows, provided the possibility of intercurrent disease or other condition affecting serology has been eliminated (e. g., recent smallpox vaccination):

1. Initially falling titer pattern; negativity not reached; subsequent rising titer (two tubes or more) confirmed by observation extending over a 2-month period.

2. Initially falling titer pattern; negativity reached; titer subsequently rising to a level of 8 or more Kahn units and maintained for at least 2 months.

3. Seronegative primary syphilis; rise in titer to 8 or more Kahn units confirmed by observation over a period of 2 months.

4. Titer pattern continuing at height of 64 Kahn units or more for a period of 1 year after treatment (allowing a one-tube, plus or minus, variation for laboratory interpretation).

*Spinal fluid manifestations.*—If the pretreatment spinal fluid is positive and posttreatment examination shows relapse or lack of definite improvement after 6 months, the patient is re-treated, provided the medical officer feels it is indicated. If the pretreatment spinal fluid is negative and if at any posttreatment examination the spinal fluid is found to be positive (group II or III by the Cooperative Clinical Group classification (*2*)), re-treatment for neurosyphilis is indicated.

For all patients requiring re-treatment, a complete medical and epidemiologic history is prepared, and the clinician is asked to indicate whether, in his opinion, the case represents a relapse or reinfection.

*Pregnancy.* — Pregnancies occurring among research patients are handled as follows:

A patient is not re-treated when pregnancy occurs after treatment, if the progress of clinical syphilis is satisfactory and if the serologic reaction is negative or declining in an orderly fashion. Careful observation of the clinical and serologic progress is recommended, of course, for the protection of the child.

The outcome of pregnancies, both of women who were treated during pregnancy and of those who conceived after treatment, is reported in all cases as soon as the outcome is known. In the event of a miscarriage, stillbirth, or infant death, the attending physician states whether he considered syphilis responsible. This opinion is substantiated by autopsy where possible.

Babies born alive without clinical syphilis are carefully observed over a period of 6 months as follows:

1. If the first blood test performed 1 month after birth is positive, the child is reexamined at the second, third, and sixth months unless treatment is instituted. Treatment on the basis of a positive serologic test for syphilis alone, however, is not indicated until after 90 days of life.

2. If the first blood test performed after birth is negative, examinations are repeated at the third and sixth months

## Standardization of Laboratory Procedures

In order that meaningful conclusions may be drawn from this study of penicillin effectiveness in syphilis, laboratory examinations must be of high caliber. Their quality must be uniform throughout the study period. Furthermore, in a research study of this type, where several laboratories are participating, all must perform the same type of tests in the same manner. Otherwise, there is danger that changes observed in laboratory findings may reflect differences in testing rather than changes in serologic status of research patients.

To achieve reliable laboratory results, a program was undertaken to standardize testing procedures in laboratories used by participating treatment facilities. This program has had two objectives: (1) to raise the quality and reproducibility of laboratory performance, and (2) to recommend specific testing procedures so that all participating laboratories will employ the same testing methods.

The Kahn standard and Kahn quantitative tests have been selected as the serologic procedures for all pretreatment and follow-up blood testing. Venereal Disease Research Laboratory standardized Kahn standard antigen is supplied to participating laboratories, together with the May 1946 technic (*3*) for performance of these tests.

The origin of the Blue Star Study, and a brief description of the procedures employed in it, have been set forth as a background for the papers which follow in this issue of THE JOURNAL OF VENEREAL DISEASE INFORMATION. The results of therapy obtained in this study, the statistical methods employed, the experience with the follow-up technic, and observations on relapse and reinfection in research patients are presented in other papers in this series.

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# II. Results of Therapy[1]

A previous report outlined the plan for an evaluation of the effectiveness of penicillin treatment in preventing relapses, late complications, or death from syphilis. Conducted by the United States Public Health Service and cooperating treatment facilities, this research study has become known as the Blue Star Study. The present report describes the results of therapy from the beginning of the study in December 1945 through May 1951.

The results of therapy are discussed in terms of cumulative re-treatment rates, seronegativity rates, serologic and spinal fluid response to treatment, and results of pregnancies of patients in the study. Follow-up of patients must continue for a much longer period before conclusions can be reached as to the efficacy of penicillin in preventing the late manifestations of syphilis.

This study is based on the experience of 1,538 selected patients, or a total of 1,769 cases when re-treatments are counted separately. The distribution of these cases by race, sex, and stage of syphilis is shown in table 1. The distribution of cases by treatment schedule and category of syphilis is presented in table 2. The schedules employing conjunctive arsenoxide and bismuth generally utilized 1 mg. per kilogram of body weight (maximum 60 mg.) of arsenoxide on the first, fourth, seventh, tenth, and thirteenth days, and 200 mg. of bismuth (oil insoluble) on the first, seventh, and thirteenth days.

### *Re-Treatment and Seronegativity Rates*

Table 3 shows the over-all results of therapy, calculated by the method used in the Division of Venereal Disease (see page 373 in this issue) for patients having primary, secondary, and early latent syphilis who were followed for five posttreatment years. As might be expected, the earlier stages of syphilis show better results in terms of seronegativity rates in each year of posttreatment observation. The cumulative re-treatment rates for primary and secondary syphilis show a pattern similar to seronegativity rates. The re-treatment rate for early latent cases, however, was lower than that for secondary and seropositive primary cases.

After the twelfth month, increases in the percentage seronegative among the primary and secondary cases were minor and of no statistical significance. Among early latent cases the percentage seronegative increased from 42.4 percent in the twelfth month to 65.0 percent in the sixtieth month—an increase that was significant at the level P=0.95.

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[1] This study has been a combined project of the Division of Venereal Disease and the cooperating treatment facilities for over 5 years. Many individuals have devoted their time and energy to the study and, moving on to other fields of endeavor, were replaced by others who also have contributed much toward the results here presented. As the labors of a large number of people are represented, no authorship has been indicated for this paper. Their individual efforts are greatly appreciated, but, unfortunately, acknowledgment can be extended only in this fashion.

Among primary and secondary cases most of the re-treatments occurred in the first year with only minor increases in the cumulative re-treatment rate occurring after the second year. Only one patient was re-treated after the forty-eighth month. This was a case of secondary syphilis and is summarized as follows:

Case No. 4133, diagnosed secondary syphilis; treatment begun July 25, 1946, consisting of 25,000 units of aqueous

**Table 1.**—*Diagnosis and stage of syphilis by race and sex of research patients with intensive follow-up*

| Diagnosis | White |  |  | Colored |  |  | Total |  |  |
|---|---|---|---|---|---|---|---|---|---|
|  | Male | Female | Total | Male | Female | Total | Male | Female | Total |
| Seronegative primary | 77 | 3 | 80 | 83 | 9 | 92 | 160 | 12 | 172 |
| Seropositive primary | 48 | 28 | 76 | 123 | 31 | 154 | 171 | 59 | 230 |
| Secondary | 130 | 125 | 255 | 264 | 449 | 713 | 394 | 574 | 968 |
| Early latent: |  |  |  |  |  |  |  |  |  |
| Previously treated | 18 | 24 | 42 | 31 | 42 | 73 | 49 | 66 | 115 |
| Not previously treated | 9 | 12 | 21 | 36 | 31 | 67 | 45 | 43 | 88 |
| Infectious relapse | 11 | 4 | 15 | 18 | 29 | 47 | 29 | 33 | 62 |
| Reinfection | 15 | 10 | 25 | 24 | 23 | 47 | 39 | 33 | 72 |
| Late latent | 1 | 3 | 4 | 5 | 17 | 22 | 6 | 20 | 26 |
| Asymptomatic central nervous system | 15 | 4 | 19 | 2 | 8 | 10 | 17 | 12 | 29 |
| Other syphilis | 3 | 3 | 6 | 1 | 0 | 1 | 4 | 3 | 7 |
| Total | 327 | 216 | 543 | 587 | 639 | 1,226 | 914 | 855 | 1,769 |

**Table 2.**—*Treatment schedules by diagnosis and stage of syphilis for research patients with intensive follow-up*

| Type of treatment and schedule | Primary |  | Secondary | Early latent |  | Infectious relapse | Reinfection | Late latent | Asymptomatic central nervous system | Other | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
|  | Seronegative | Seropositive |  | Previously treated | Not previously treated |  |  |  |  |  |  |
| Aqueous penicillin alone: |  |  |  |  |  |  |  |  |  |  |  |
| 2,800,000 u., 25,000 every 3 hrs | 48 | 80 | 191 | 14 | 22 | 1 | 4 | 9 | 5 | 3 | 377 |
| 3,400,000 u., 40,000 every 2 hrs | 33 | 44 | 154 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 231 |
| 5,600,000 u., 33,333 every 2 hrs | ------ | ------ | ------ | 15 | ------ | 21 | 23 | ------ | ------ | ------ | 59 |
| Other | ------ | ------ | ------ | 3 | ------ | ------ | 7 | ------ | ------ | ------ | 10 |
| Penicillin (peanut oil and beeswax): |  |  |  |  |  |  |  |  |  |  |  |
| 3,000,000 u., 300,000 every day | 19 | 11 | 13 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 43 |
| 3,000,000 u., 600,000 every day | 9 | 5 | 28 | ------ | ------ | ------ | ------ | ------ | ------ | ------ | 42 |
| 4,200,000 u., 300,000 every day | 8 | 21 | 98 | 1 | 15 | ------ | 1 | 5 | 1 | ------ | 150 |
| Other | 1 | ------ | 1 | 1 | ------ | 1 | 3 | ------ | 4 | 2 | 13 |
| Aqueous penicillin with arsenoxide and bismuth: |  |  |  |  |  |  |  |  |  |  |  |
| 1,800,000 u., 16,667 every 2 hrs | 7 | 12 | 36 | 14 | 16 | ------ | 1 | 2 | ------ | ------ | 88 |
| 2,800,000 u., 25,000 every 3 hrs | 39 | 43 | 225 | 12 | 20 | ------ | 2 | 2 | 5 | ------ | 348 |
| 5,600,000 u., 33,333 every 2 hrs | ------ | ------ | ------ | 36 | ------ | 32 | 22 | 3 | 1 | ------ | 94 |
| Other | ------ | ------ | 4 | 2 | 2 | ------ | ------ | 1 | 6 | ------ | 15 |
| Penicillin (peanut oil and beeswax) with arsenoxide and bismuth: |  |  |  |  |  |  |  |  |  |  |  |
| 4, 200,000 u., 300,000 every day | 8 | 14 | 26 | 5 | 13 | 1 | 1 | 3 | 3 | ------ | 74 |
| Other | ------ | ------ | ------ | ------ | ------ | ------ | 1 | ------ | 2 | 1 | 4 |
| Penicillin with 2 percent aluminum monostearate: |  |  |  |  |  |  |  |  |  |  |  |
| 2,400,000 u., 1 session | ------ | ------ | 127 | 1 | ------ | ------ | 1 | ------ | ------ | ------ | 129 |
| 4,800,000 u., 1 session | ------ | ------ | 56 | ------ | ------ | 2 | ------ | ------ | ------ | ------ | 58 |
| Other | ------ | ------ | 9 | 11 | ------ | 4 | 6 | 1 | 2 | 1 | 34 |
| Total | 172 | 230 | 968 | 115 | 88 | 62 | 72 | 26 | 29 | 7 | 1, 769 |

**Table 3.**—***Results of therapy through 60 months of posttreatment observation by stage of syphilis for research patients with intensive follow-up***

| Posttreatment observation period | Patients with no previous treatment for syphilis | | | |
|---|---|---|---|---|
| | Cases observed | Cumulative percent re-treated | Percent not re-treated | |
| | | | Seropositive | Seronegative |
| | Seronegative primary—172 cases treated | | | |
| 12th month | 166 | 6.6 | 0.0 | 93.5 |
| 24th month | 163 | 7.8 | .0 | 92.3 |
| 36th month | 94 | 7.8 | .0 | 92.3 |
| 48th month | 41 | 7.8 | .0 | 92.3 |
| 60th month | 10 | 7.8 | .0 | 92.3 |
| | Seropositive primary—230 cases treated | | | |
| 12th month | 223 | 9.1 | 7.2 | 83.5 |
| 24th month | 217 | 12.8 | 4.6 | 82.4 |
| 36th month | 148 | 13.3 | 2.0 | 84.5 |
| 48th month | 84 | 14.5 | 1.2 | 84.2 |
| 60th month | 25 | 14.5 | .0 | 85.4 |
| | Secondary—968 cases treated | | | |
| 12th month | 803 | 12.0 | 13.8 | 74.1 |
| 24th month | 729 | 15.4 | 6.2 | 78.3 |
| 36th month | 489 | 16.5 | 4.5 | 78.9 |
| 48th month | 248 | 17.1 | 2.8 | 80.0 |
| 60th month | 32 | 17.9 | 3.2 | 79.0 |
| | Early latent—88 cases treated | | | |
| 12th month | 85 | 3.4 | 54.1 | 42.4 |
| 24th month | 78 | 6.9 | 44.6 | 48.4 |
| 36th month | 78 | 10.7 | 39.5 | 49.7 |
| 48th month | 77 | 12.0 | 31.0 | 56.9 |
| 60th month | 26 | 12.0 | 22.9 | 65.0 |

crystalline penicillin G every 3 hours for 14 days (a total of 2,800,000 units).

Quantitative serologic test for syphilis (STS) in Kahn units: pretreatment, 64; first year posttreatment, by month, 16, 16, 8, 32, 32, 32, 64, 64, 32, 16, 64, 32; second year, 64 at 606 days, 32 at 629 days, and 16 at 728 days; 16 at the thirtieth, thirty-sixth, and forty-second months; 8 at forty-eighth month; and 16 at fifty-fourth month.

Results of pregnancies: (1) infant delivered January 12, 1947, was given for adoption before its syphilis status could be determined; (2) infant delivered July 30, 1949, confirmed nonsyphilitic with negative STS 11 months after birth.

The patient was stated to have been injured in a fall in April 1950, which was accompanied or followed by flaccid paralysis from the hips down. She was diagnosed in a county hospital in October

Spinal fluid examinations:

| *Period* | *Cells* | *Protein (mg. percent)* | *Complement-fixation* | *Colloidal* |
|---|---|---|---|---|
| Admission | 0 | 14 | Kolmer negative | Not done |
| 12th month | 0 | Not done | Kolmer negative | Not done |
| 24th month | 13 | 32 | Kolmer negative | Not done |
| 52d month | 34 | 162 | Wassermann positive in 0.25 cc. | 3555555420 |
| 52d month | Not done | Not done (globulin 1+) | Wassermann positive in 0.25 cc. | 5555555543 |

Table 4.—*Results of therapy for secondary syphilis, selected schedulesutilizing crystalline penicillin G in aqueous solution*

| Observation period (months) | Re-treated on basis of— | | | | | | | | | | | | Not re-treated | | | | Tota cases |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Serology | | | Clinical relapse | | | Probable reinfection | | | Total re-treated | | | Seropositive | | Seronegative | | |
| | Number | Percent | Cumulative percent | Number | Percent | Cumulative percent | Number | Percent | Cumulative percent | Number | Percent | Cumulative percent | Number | Percent | Number | Percent | |
| 2,800,000 units: 25,000 every 3 hours (14 days) | | | | | | | | | | | | | | | | | |
| 0–1 | | | | | | | | | | | | | 167 | 99.4 | 1 | 0.6 | 168 |
| 1–2 | | | | 1 | 0.6 | 0.6 | 1 | 0.6 | 0.6 | 2 | 1.2 | 1.2 | 145 | 86.3 | 21 | 12.5 | 168 |
| 2–3 | | | | | | .6 | | | .6 | | | 1.2 | 117 | 70.1 | 48 | 28.7 | 167 |
| 3–4 | | | | 2 | 1.2 | 1.8 | 1 | .6 | 1.2 | 3 | 1.8 | 3.0 | 87 | 52.1 | 75 | 44.9 | 167 |
| 4–5 | | | | 1 | .6 | 2.4 | | | 1.2 | 1 | .6 | 3.6 | 64 | 38.3 | 97 | 58.1 | 167 |
| 5–6 | 2 | 1.2 | 1.2 | 2 | 1.2 | 3.6 | 1 | .6 | 1.8 | 5 | 3.0 | 6.6 | 50 | 29.9 | 106 | 63.5 | 167 |
| 6–7 | 2 | 1.2 | 2.4 | 1 | .6 | 4.2 | | | 1.8 | 3 | 1.8 | 8.4 | 40 | 24.1 | 112 | 67.5 | 166 |
| 7–8 | | | 2.4 | 1 | .6 | 4.8 | | | 1.8 | 1 | .6 | 9.0 | 34 | 20.5 | 117 | 70.5 | 166 |
| 8–9 | 2 | 1.2 | 3.6 | | | 4.8 | | | 1.8 | 2 | 1.2 | 10.2 | 30 | 18.1 | 119 | 71.7 | 166 |
| 9–10 | 2 | 1.2 | 4.8 | | | 4.8 | | | 1.8 | 2 | 1.2 | 11.4 | 24 | 14.7 | 121 | 73.9 | 164 |
| 10–11 | 1 | .6 | 5.4 | 2 | 1.2 | 6.0 | | | 1.8 | 3 | 1.8 | 13.2 | 21 | 12.8 | 121 | 73.9 | 164 |
| 11–12 | 1 | .6 | 6.0 | | | 6.0 | | | 1.8 | 1 | .6 | 13.8 | 18 | 11.0 | 123 | 75.1 | 164 |
| 12–15 | 2 | 1.2 | 7.2 | | | 6.0 | 1 | .6 | 2.4 | 3 | 1.8 | 15.6 | 13 | 7.9 | 125 | 76.4 | 164 |
| 15–18 | 2 | 1.2 | 8.4 | | | 6.0 | | | 2.4 | 2 | 1.2 | 16.8 | 8 | 4.9 | 127 | 78.2 | 163 |
| 18–21 | | | 8.4 | | | 6.0 | 2 | 1.2 | 3.6 | 2 | 1.2 | 18.0 | 9 | 5.5 | 124 | 76.3 | 163 |
| 21–24 | | | 8.4 | | | 6.0 | | | 3.6 | | | 18.0 | 8 | 5.0 | 123 | 76.8 | 160 |
| 24–30 | | | 8.4 | | | 6.0 | 1 | .8 | 4.4 | 1 | .8 | 18.8 | 5 | 3.8 | 102 | 77.3 | 132 |
| 30–36 | | | 8.4 | | | 6.0 | 1 | 1.0 | 5.4 | 1 | 1.0 | 19.8 | 5 | 4.8 | 78 | 75.3 | 104 |
| 36–42 | | | 8.4 | | | 6.0 | | | 5.4 | | | 19.8 | 3 | 4.7 | 48 | 75.4 | 64 |
| 42–48 | | | 8.4 | | | 6.0 | | | 5.4 | | | 19.8 | 3 | 6.9 | 32 | 73.3 | 44 |
| 48–54 | | | 8.4 | 1 | 2.8 | 8.8 | | | 5.4 | 1 | 2.8 | 22.6 | 2 | 5.5 | 26 | 71.8 | 36 |
| 2,800,000 units: 25,000 every 3 hours plus arsenoxide and bismuth (14 days) | | | | | | | | | | | | | | | | | |
| 0–1 | | | | | | | | | | | | | 193 | 99.5 | 1 | 0.5 | 194 |
| 1–2 | | | | | | | | | | | | | 179 | 92.7 | 14 | 7.3 | 193 |
| 2–3 | | | | | | | 1 | 0.5 | 0.5 | 1 | 0.5 | 0.5 | 141 | 73.8 | 49 | 25.7 | 191 |
| 3–4 | | | | | | | 2 | 1.0 | 1.5 | 2 | 1.0 | 1.5 | 109 | 57.1 | 79 | 41.4 | 191 |
| 4–5 | | | | 2 | 1.1 | 1.1 | | | 1.5 | 2 | 1.1 | 2.6 | 80 | 42.1 | 105 | 55.3 | 190 |
| 5–6 | | | | 1 | .5 | 1.6 | 2 | 1.1 | 2.6 | 3 | 1.6 | 4.2 | 61 | 32.1 | 121 | 63.7 | 190 |
| 6–7 | 3 | 1.6 | 1.6 | | | 1.6 | 1 | .5 | 3.1 | 4 | 2.1 | 6.3 | 48 | 25.4 | 129 | 68.3 | 189 |
| 7–8 | | | 1.6 | | | 1.6 | | | 3.1 | | | 6.3 | 42 | 22.2 | 135 | 71.5 | 189 |
| 8–9 | 1 | .5 | 2.1 | 1 | .5 | 2.1 | | | 3.1 | 2 | 1.1 | 7.4 | 36 | 19.1 | 139 | 73.6 | 189 |
| 9–10 | 1 | .5 | 2.6 | | | 2.1 | | | 3.1 | 1 | .5 | 7.9 | 35 | 18.7 | 137 | 73.3 | 187 |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10–11 | 1 | .5 | 3.1 | | | 2.1 | | | 3.1 | 1 | .5 | 8.4 | 30 | 16.2 | 140 | 75.4 | 186 |
| 11–12 | 3 | 1.6 | 4.7 | | | 2.1 | | | 3.1 | 3 | 1.6 | 10.0 | 26 | 14.0 | 141 | 75.9 | 186 |
| 12–15 | 3 | 1.6 | 6.3 | | | 2.1 | 1 | .6 | 3.7 | 4 | 2.2 | 12.2 | 20 | 10.8 | 142 | 76.9 | 185 |
| 15–18 | 1 | .6 | 6.9 | | | 2.1 | 1 | .6 | 4.3 | 2 | 1.1 | 13.3 | 15 | 8.3 | 142 | 78.4 | 181 |
| 18–21 | 2 | 1.1 | 8.0 | | | 2.1 | 1 | .6 | 4.9 | 3 | 1.7 | 15.0 | 9 | 5.0 | 144 | 80.0 | 180 |
| 21–24 | 1 | .6 | 8.6 | | | 2.1 | | | 4.9 | 1 | .6 | 15.6 | 6 | 3.4 | 144 | 81.1 | 178 |
| 24–30 | | | 8.6 | | | 2.1 | | | 4.9 | | | 15.6 | 5 | 2.9 | 139 | 81.5 | 171 |
| 30–36 | | | 8.6 | | | 2.1 | | | 4.9 | | | 15.6 | 5 | 3.5 | 117 | 81.0 | 144 |
| 36–42 | | | 8.6 | | | 2.1 | 1 | 1.0 | 5.9 | 1 | 1.0 | 16.6 | 4 | 4.1 | 77 | 79.3 | 97 |
| 42–48 | | | 8.6 | | | 2.1 | | | 5.9 | | | 16.6 | 2 | 3.6 | 44 | 79.8 | 55 |
| 48–54 | | | 8.6 | | | 2.1 | | | 5.9 | | | 16.6 | | | 9 | 83.4 | 11 |
| | 3,400,000 units: 40,000 every 2 hours (7 days) | | | | | | | | | | | | | | | | |
| 0–1 | | | | | | | | | | | | | 153 | 99.4 | 1 | 0.6 | 154 |
| 1–2 | | | | 1 | 0.7 | 0.7 | | | | 1 | 0.7 | 0.7 | 145 | 94.8 | 7 | 4.6 | 153 |
| 2–3 | | | | | | .7 | | | | | | .7 | 122 | 79.7 | 30 | 19.6 | 153 |
| 3–4 | | | | 2 | 1.3 | 2.0 | 1 | 0.7 | 0.7 | 3 | 2.0 | 2.7 | 98 | 64.1 | 51 | 33.3 | 153 |
| 4–5 | | | | 3 | 2.0 | 4.0 | | | .7 | 3 | 2.0 | 4.7 | 79 | 51.6 | 67 | 43.8 | 153 |
| 5–6 | | | | | | 4.0 | | | .7 | | | 4.7 | 71 | 46.4 | 75 | 49.0 | 153 |
| 6–7 | 2 | 1.3 | 1.3 | 2 | 1.3 | 5.3 | | | .7 | 4 | 2.6 | 7.3 | 59 | 38.6 | 83 | 54.2 | 153 |
| 7–8 | | | 1.3 | | | 5.3 | 1 | .7 | 1.4 | 1 | .7 | 8.0 | 51 | 33.3 | 90 | 58.8 | 153 |
| 8–9 | 1 | .7 | 2.0 | 1 | .7 | 6.0 | | | 1.4 | 2 | 1.3 | 9.3 | 39 | 25.7 | 99 | 65.2 | 152 |
| 9–10 | | | 2.0 | | | 6.0 | | | 1.4 | | | 9.3 | 32 | 21.1 | 106 | 69.8 | 152 |
| 10–11 | | | 2.0 | | | 6.0 | | | 1.4 | | | 9.3 | 29 | 19.2 | 108 | 71.6 | 151 |
| 11–12 | | | 2.0 | | | 6.0 | | | 1.4 | | | 9.3 | 23 | 15.3 | 114 | 75.6 | 151 |
| 12–15 | 1 | .7 | 2.7 | | | 6.0 | | | 1.4 | 1 | .7 | 10.0 | 19 | 12.7 | 116 | 77.5 | 150 |
| 15–18 | | | 2.7 | | | 6.0 | | | 1.4 | | | 10.0 | 19 | 12.7 | 116 | 77.5 | 150 |
| 18–21 | | | 2.7 | 1 | .7 | 6.7 | | | 1.4 | 1 | .7 | 10.7 | 14 | 9.4 | 119 | 80.1 | 149 |
| 21–24 | | | 2.7 | | | 6.7 | | | 1.4 | | | 10.7 | 11 | 7.5 | 121 | 82.0 | 147 |
| 24–30 | | | 2.7 | | | 6.7 | | | 1.4 | | | 10.7 | 8 | 6.4 | 104 | 83.1 | 125 |
| 30–36 | | | 2.7 | | | 6.7 | 1 | 2.8 | 4.2 | 1 | 2.8 | 13.5 | 1 | 2.8 | 30 | 83.9 | 36 |
| 36–42 | | | 2.7 | | | 6.7 | | | 4.2 | | | 13.5 | | | 1 | 86.7 | 1 |

1950 as having myelomalacia, central nervous system (CNS) syphilis, and adhesive arachnoiditis of spinal cord. Treatment with 21,000,000 units of penicillin was given between October 6 and December 20, 1950. After this treatment the patient did not return to the hospital, details of the clinical course are vague, and she died April 8, 1951. No autopsy was performed, and death was certified as due simply to injury sustained in a fall.

Thus far this is the only patient observed in the study who had early syphilis with any evidence of clinical progression into late syphilis. She represents less than 1 percent of the secondary cases observed at the forty-eighth to fifty-fourth month of observation. The serologic pattern following treatment suggests that this case was actually a serologic relapse at the fourth posttreatment month, and, as time passed, progression into the stage of neurosyphilis was observed, first becoming evident at the twenty-fourth posttreatment month as an asymptomatic central nervous system syphilis (probably becoming manifest at the forty-eighth month).

## *Results in Secondary Syphilis*

The results of treatment for secondary syphilis with the three study schedules having the greatest volume of cases are shown in table 4 and figure 1. Only results for crystalline penicillin G are shown. These schedules are 2,800,000 units of aqueous penicillin alone given 25,000 units every 3 hours for 14 days; 2,800,000 units of aqueous penicillin given 25,000 units every 3 hours for 14 days with conjunctive arsenoxide and bismuth; and 3,400,000 units of aqueous penicillin given 40,000 units every 2 hours for 7 days. No significant differences were noted among the three schedules in the cumulative re-treatment rates at the twenty-fourth month or thereafter (at the level P=0.95).

Comparing the 2,800,000-unit schedules with and without arsenoxide and bismuth, no significant differences were observed at the 12-month period or thereafter in either the cumulative re-treatment rates in total, in the re-treatment rates exclusive of probable reinfections, or in the seronegativity rates. Results of the study tend to confirm conclusions

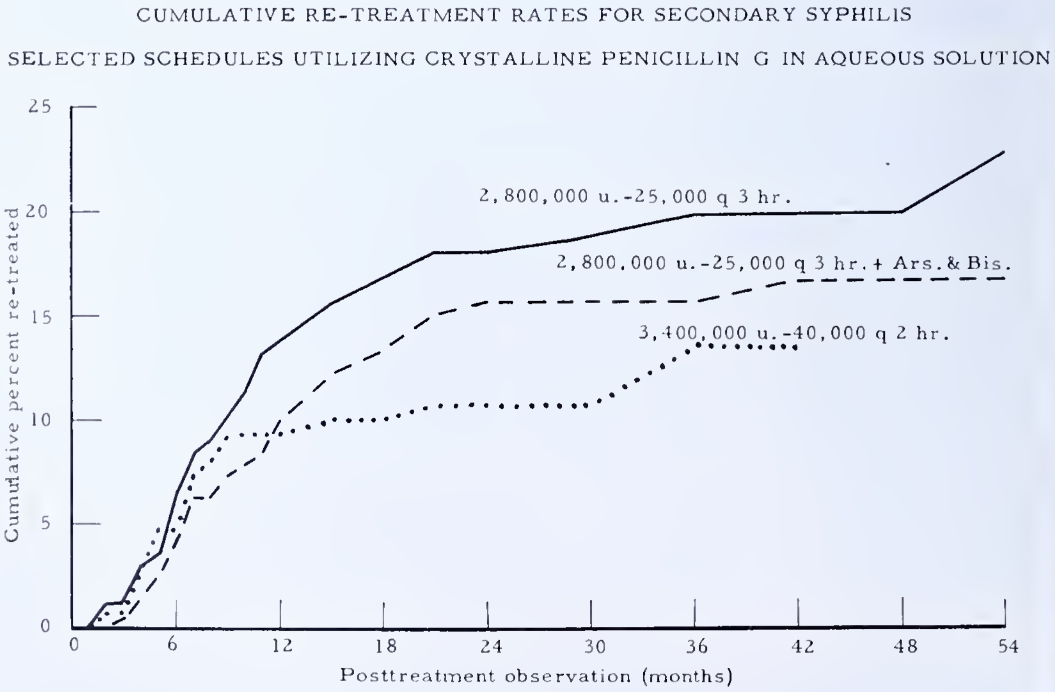


FIGURE 1.

reached in other investigations; that is, there is considerable doubt about the increased efficacy of conjunctive arsenoxide and bismuth with penicillin therapy for syphilis. Even should there be a slight therapeutic advantage, the difference in results (if any) is so small that administration of arsenic and bismuth does not appear to be justified in view of the risk involved.

### *Deaths*

There have been 20 deaths of Blue Star patients. The causes of death are summarized as follows: tuberculosis, 4; circulatory diseases, 3; homicide, 3; motor vehicle accidents, 3; other accidents, 2; cancer, 2; diaphragmatic hernia, 1; tetanus and acute toxic hepatitis, 1; and pneumonia with myocarditis, 1. In only two instances were autopsies performed. No evidence of syphilis was noted on either autopsy report; one death was due to tuberculous meningitis and the other, to tetanus and acute toxic hepatitis. No microscopic examinations, however, were reported for either autopsy.

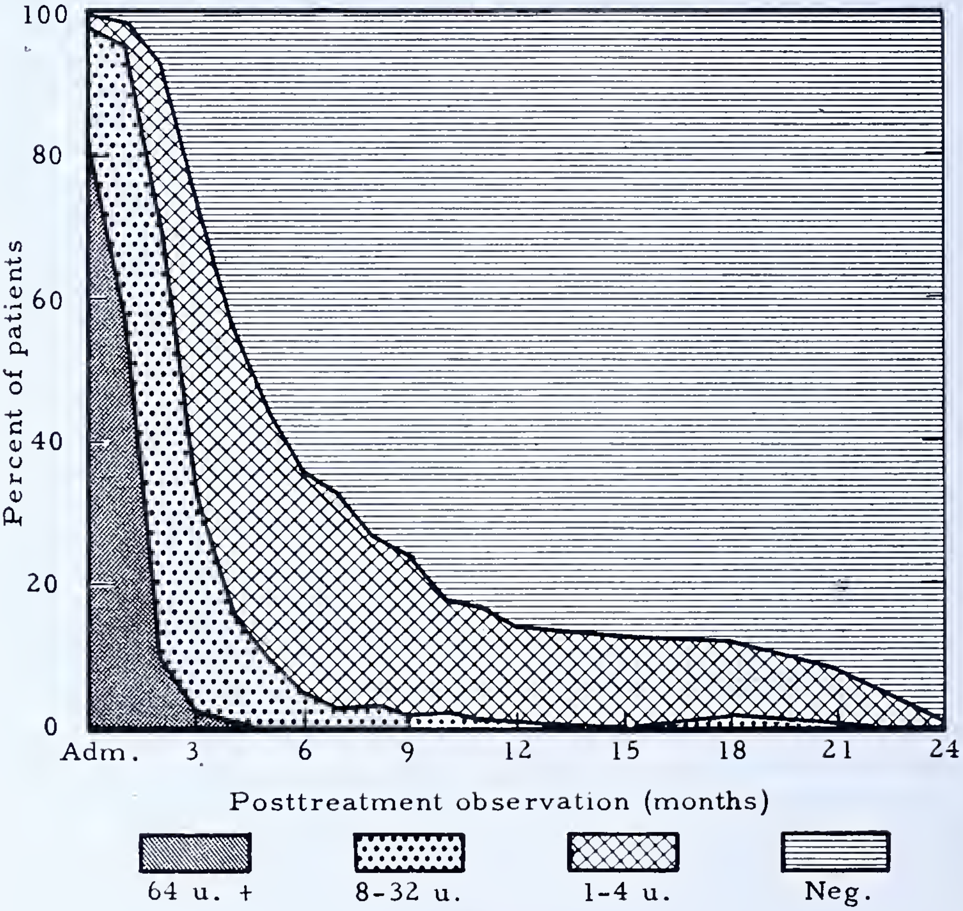
One death, listed under "other accidents," was the patient whose history has already been given. Although there was definite progression to CNS syphilis, there is insufficient available evidence to determine the relationship between syphilis and the fall in causing death. One other patient, killed in a motor vehicle accident 200 days after treatment, had a Kahn titer of 128 units 3 weeks before his accident and is considered to have had a serologic relapse. Nevertheless, no evidence associates syphilis with his death. In the other 18 cases there was satisfactory progress after treatment. Sixteen patients had negative STS at the last observation prior to death, and two had declining titers at that time, although they were not yet serologically negative.

### *Serologic Response to Treatment*

Since approximately 90 percent of the scheduled posttreatment observations have been completed, these research cases constitute an ideal group for an evaluation of the response to treatment of the quantitative serologic test. Of 365 patients treated for secondary syphilis at least 2 years ago, i. e., prior to May 1, 1949, with 2,400,000 units or more of crystalline penicillin G alone, 280 were serologically negative at the twenty-fourth month, 26 were positive, and 59 had been re-treated. Of the 280 patients negative serologically at the twenty-fourth posttreatment month, 271 had sufficiently complete follow-up records to establish an accurate titer pattern. (The 9 excluded cases had missed two or more consecutive observations.) It is felt that the titer pattern of these 271 patients should furnish an excellent guide to the response which may be expected during 2 years of posttreatment observation among patients whose serologic course is satisfactory.

The percentage distribution of serologic titers (in groups of Kahn units) is shown on admission and by month of posttreatment observation in figure 2. The percentage of cases with titers of 64 Kahn units, or more, declines rapidly from 83 percent on admission to less than 2 percent by the third month. By the ninth month only 1 percent had titers of 8 Kahn units or more. In no case was there a titer above 32 units after the fifth month or above 8 units after the eleventh month. After the third month the percentages of patients with titers of 1 to 4 Kahn units decrease slowly to the twenty-fourth month. It appears that the percentage of patients with high titers decreases quickly after treatment, but the low titers, particularly 1 or 2 units, tend to "hang on" for many months before becoming negative.

Among the 365 patients treated for secondary syphilis at least 2 years ago with 2,400,000 units or more of penicillin G alone, 59 required re-treatment. Of these 59 patients, 16 were re-treated by the sixth month after treatment. All of these 16 patients had clinical evidence of syphilis when re-treated. Thirteen had darkfield-positive lesions, 2 had suspicious lesions accompanied by a rise in serologic titer, and 1 had exacerbation of secondary lesions immediately following



SEROLOGIC TITER (Kahn units) AMONG PATIENTS TREATED FOR SECONDARY SYPHILIS BY PERIOD OF OBSERVATION

271 Cases Treated for Secondary Syphilis with 2,400,000 u. or more of Penicillin G, Serologically Negative at 24th Month

FIGURE 2.

treatment. Although the number of cases is small, the experience of this group of 16 cases seems to point up the desirability of performing a careful physical inspection for lesions whenever a serologic test for syphilis is obtained. Three of the 16 cases did not have titer increases at the time the new lesion was detected, and in the other 13 cases failure to perform physical examinations would have meant a delay of re-treatment until the rise in titer was verified.

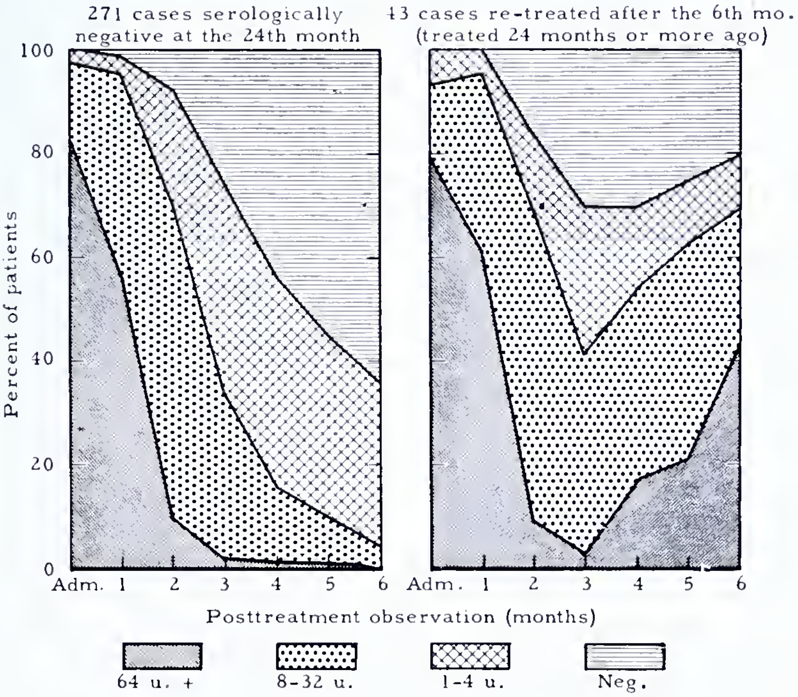
In figure 3 the titer pattern during the first 6 months following treatment of patients serologically negative at 2 years is compared with the titer pattern of those re-treated after 6 months of posttreatment observation. Up to the third month the two groups have similar titer patterns. After the third month an increasing percentage of those re-treated after the sixth month have high titers while among those negative at 24 months the percentage with high titers continues to decline. At 6 months patients with Kahn titers of 8 units or more represented only 5 percent of those negative at 2 years, as compared with 70 percent among those re-treated after 6 months. It is possible that a patient with a titer of 8 or more units after 6 months of posttreatment observation might be one of the small percentage with such titers who become negative by 2 years. But in view of the fact that 70 percent, or 30 out of 43 patients, with titers of 8 Kahn units or more at 6 months required re-treatment, it would seem that any patient treated for primary or secondary syphilis and having a Kahn titer of 8 units or more at 6 months should be re-treated if close observation cannot be expected.

### *Spinal Fluid Response to Treatment*

Spinal fluid examinations were requested on all Blue Star patients prior to treatment and at 1 and 5 years after treatment. Pretreatment examinations were performed on 95 percent of the 1,538 Blue Star patients. In some instances examinations were deferred because of pregnancy; in others, the attempt was unsuccessful, or the specimen was too bloody for analysis. Eighty-two percent of the cases available for observation at the end of the first posttreatment year had spinal fluid examinations at that time. Of those who have completed 5 years of observation, 44 percent have submitted to the fifth-year spinal.

In the primary stage, only 1 of 375 patients examined prior to treatment had an abnormal fluid—a cell count of 18. In the secondary stage, of 919 patients examined, 63 (6.9 percent) had abnormal fluids. In 4.2 percent the degree of abnormality was group I (*1*) (10 or more cells, negative complement-fixation test) and in 2.4 percent, group II (positive complement-fixation test, with or without increased cell count or protein content). Group III fluids (strongly positive complement-fixation test and colloidal curve of the paretic type) were observed in only two patients.

Little difference was found in a com-



COMPARISON OF POSTTREATMENT SEROLOGIC TITERS (Kahn units) FOR PATIENTS WITH SATISFACTORY TREATMENT RESULTS AND FOR THOSE REQUIRING RE-TREATMENT

271 cases serologically negative at the 24th month

43 cases re-treated after the 6th mo. (treated 24 months or more ago)

FIGURE 3.

parison of rates of abnormal fluids by race and sex in the secondary stage of syphilis. The rate of positivity varied in the four race-sex groups from 6.3 percent among white females to 7.7 percent among Negro males.

Forty-four of the 64 patients treated for primary and secondary syphilis who had abnormal spinal fluid tests before treatment were examined after treatment. Forty were negative on reexamination; 3, less positive; and in only 1 had the spinal fluid progressed. This patient prior to treatment had a group II fluid with 20 cells, 32 protein, and complement-fixation test 2+ in 0.25 cc. Six months after treatment with 1,800,000 units of penicillin, 300 mg. of arsenoxide and 600 mg. of bismuth (5-18-3 schedule), examination of the spinal fluid revealed 84 cells, 48 protein, complement-fixation test 4+ in 0.25 cc., and a colloidal curve of 5552210000. An increase from 32 to 256 Kahn units in the blood test accompanied the spinal fluid relapse, and the patient was re-treated.

Among patients with a negative spinal fluid before treatment, 321 with primary syphilis and 591 with secondary syphilis had one or more spinal fluid examinations following treatment. Of these 912 cases, 836 were examined 1 year or more after treatment and 194, 2 years or more after treatment. Eight patients with primary and 21 with secondary syphilis (2.5 and 3.6 percent, respectively) had positive spinal fluid tests following treatment. Twenty-one of the 29 fluids were group I (2 later progressing), 6 were group II, and 2 were group III. All group II and group III fluids were first discovered at the time of diagnosis of serorelapse, infectious relapse, or reinfection.

Of the 21 group I fluids, 16, or 76 percent, were observed in patients with negative blood tests. No subsequent spinal fluid examinations have been obtained on 10 of these patients, but the other 6 were reexamined and found to be negative. Three of the 5 patients who had group I spinal fluids and positive blood tests were re-treated at the time of the spinal fluid examination—2 for infectious relapse and 1 for serorelapse. The other 2 patients were not re-treated even though the Kahn titer, which had dropped to 8 units during the first 3 months of observation, had risen again to 64 units prior to the spinal fluid examination. In both patients the spinal fluid progressed, one to group II and the other to group III. The latter patient is the one progression to symptomatic neurosyphilis whose case history was presented earlier in this report.

### *Outcomes of Pregnancy*

There have been 354 pregnancies reported among the 855 females in the study. The outcomes of pregnancy are known in 320. Of the remaining 34, one woman died during the seventh or eighth month of gestation (20 months following treatment) with the cause of death recorded on the death certificate as "diaphragmatic hernia." Twenty women had not delivered as of May 1951. In 13 pregnancies the delivery is presumed to have occurred, but no information is available either because the mother had lapsed from observation, or for other reasons.

The mother was treated during pregnancy in 95 of the known outcomes. There were 6 stillbirths, miscarriages, and abortions for a fatality ratio of 67.4 per thousand live births. Among 225 women treated prior to pregnancy the fatality ratio is 113.4 per thousand live births (23 stillbirths, miscarriages, and abortions). The difference between these two ratios is not significant (P= 0.95); however, some difference would be expected since the women treated during pregnancy had only slightly over 4 months in which a fatal outcome could occur compared to 9 months in women treated prior to pregnancy. The fatality ratio among patients treated prior to pregnancy does not appear to be abnormally high. In New York City, where all products of conception are required to be reported, the fatality ratio in 1948 was 90.8 per thousand live births (2). While the fatality ratio among patients treated prior to pregnancy in this study is higher than the New York City figure, this result is not unexpected in a research study where patients were under closer medical observation than the general population and are thus subject to better reporting.

The known outcomes of pregnancy have been classified according to their syphilis status as follows:

1. Confirmed nonsyphilitic outcomes: confirmation by negative STS after at least 90 days of life or by autopsy which showed no evidence of syphilis. It might be added that 87 percent of the infants born alive and confirmed as nonsyphilitic had serologic tests at 6 months or later.
2. Confirmed syphilitic outcomes: diagnosis of syphilis established by clinical evidence, serology, or autopsy.
3. Unconfirmed outcomes: those whose status could not be established, including fatal outcomes or neonatal deaths in which no autopsy was performed.

Among patients treated during pregnancy, the syphilis status of the infant has been established in 73 outcomes. Only 1 was a confirmed syphilitic outcome, for an infected rate of 1.4 percent. The history of this case follows:

The patient, a white female, aged 18, was treated with 2,800,000 units of aqueous penicillin G plus arsenoxide and bismuth for secondary syphilis when she was 6 months pregnant. Thirty-four days after beginning treatment, the patient was delivered of a premature, stillborn, macerated fetus. Spirochetes were demonstrated in lung and spleen. In spite of the presence of spirochetes in the fetus, the mother has continued on an apparently satisfactory course. Her serologic titer steadily declined from 128 units prior to treatment to 16 units 40 days following treatment (6 days post partum) and to negative 173 days following treatment. From that time through 727 days her titer fluctuated between negative and 3 Kahn units, and has been negative at 908 days and 1,087 days (3 years).

In one unconfirmed outcome of a mother treated during pregnancy the infant had a titer of 32 Kahn units at 13 days and doubtful Kahn results at 32 and 38 days. No subsequent data have been received to establish the syphilitic status.

Among patients treated prior to pregnancy, the syphilitic status has been established in 138 outcomes. Again, there was only one confirmed syphilitic outcome for a rate of 0.7 percent. A brief history follows:

A white female, aged 21, was treated for seropositive primary syphilis with 2,800,000 units of aqueous amorphous penicillin with conjunctive arsenoxide and bismuth. The STS had reversed to negative by the twenty-first day after the institution of treatment and remained so throughout the first year of observation. The patient, who was in her seventh month of pregnancy at the end of the first posttreatment year, was placed on a 3-month observation schedule. She was next examined 2 weeks after the birth of her baby, at which time her serologic test showed 128 Kahn units. She also exhibited macular lesions of the palms which were darkfield negative. She was reexamined 7 and 9 days later, and on each examination the lesions were darkfield negative and the serologic titer, 128 units. A diagnosis of secondary syphilis, reinfection, was made, and the patient re-treated.

The baby was first examined 26 days after birth, and the Kahn test was negative. At the next examination, 96 days after birth, the Kahn titer was 256 units. A diagnosis of congenital syphilis was made and treatment was instituted.

This case illustrates the necessity for obtaining a serologic test late in pregnancy as well as the usual test early in pregnancy.

Among the patients treated prior to pregnancy, there were two whose infants were of questionable status. One infant was serologically negative at 5 months and doubtful at 8 months, and the other had only one STS, which was doubtful at 7 months. No further information has been received on these infants.

The results found in this study confirm other studies indicating that penicillin is adequate in preventing congenital syphilis and that, if the progress following treatment is satisfactory, no additional penicillin treatment is necessary in pregnancies subsequent to treatment.

## Summary

1. Results of penicillin therapy for syphilis are presented for patients selected for intensive follow-up in a research study, commonly called the Blue Star Study, being conducted by the United States Public Health Service and cooperating facilities.

2. At the twenty-fourth month of posttreatment observation the seronegativity rates were 92.3 percent for seronegative primary cases, 82.4 percent for seropositive primary cases, 78.3 percent for secondary cases, and 48.4 percent for early latent cases.

3. Only negligible differences (statistically not significant) in the results of therapy were observed in comparing penicillin alone and penicillin with conjunctive arsenoxide and bismuth where a total of 2,800,000 units of crystalline penicillin G in aqueous solution was used.

4. Among 20 deaths of research patients, in only 1 was there any evidence that syphilis might be contributory; however, the possible presence of syphilis at death was not ruled out in any of the 20 cases since no microscopic examinations of tissue were made.

5. Of 43 patients with titers of 8 Kahn units or more at 6 months, 30 (70 percent) required re-treatment. The 13 cases not requiring re-treatment represented only 5 percent of those serologically negative at the twenty-fourth month, but the 30 cases requiring re-treatment represented 70 percent of the cases requiring re-treatment after 6 months. From this it would appear that any patient with a Kahn titer of 8 units or more at 6 months posttreatment should be re-treated if close observation cannot be expected.

6. Among 375 patients with primary syphilis who had a pretreatment spinal fluid examination, only one had an abnormal spinal fluid. In the secondary stage, 6.9 percent of 919 patients examined had abnormal fluids. Among patients with abnormal spinal fluids prior to treatment, only one (2.3 percent) had a spinal fluid progression. Among patients with negative pretreatment spinal fluid examinations, 2.5 percent of those with primary syphilis and 3.6 percent of those with secondary syphilis had positive spinal fluids following treatment. All group II and group III fluids were first discovered at the time of diagnosis of serorelapse, infectious relapse, or reinfection.

7. Among 95 outcomes of pregnancy of patients treated during pregnancy, the fatality ratio was 67.4 per thousand live births. The syphilis status was established in 73 outcomes, of which one was syphilitic (1.4 percent).

8. Among 225 outcomes of pregnancy of patients treated prior to pregnancy, the fatality ratio was 113.4 per thousand live births. Among the 138 outcomes whose syphilis status is known, there was only one confirmed syphilitic patient for a rate of 0.7 percent.

## References

1. KIERLAND, R. R.; O'LEARY, P. A.; VANDORN, E.: Symptomatic neurosyphilis. Ven. Dis. Inform., 23: 360–377, October 1942.
2. Unpublished data from the National Office of Vital Statistics, U. S. Public Health Service.

# III. Statistical Method of Analysis and Its Critical Evaluation

Albert P. Iskrant; [1] Quentin R. Remein; [2] and James F. Donohue [3]

A preceding report in this series (page 359 in this issue) considered the results of therapy obtained in a research study to evaluate the effectiveness of penicillin therapy for syphilis. The study, commonly known as the Blue Star Study, is being conducted by the Division of Venereal Disease of the United States Public Health Service and cooperating treatment facilities. The present report describes the statistical method of analyzing results of therapy used in this and other therapy evaluation studies conducted by this Division.

Several considerations are basic to a proper statistical evaluation of the results of therapy. In any study it is important that the population to be analyzed be carefully defined and that all persons cooperating in the study adhere to the same definitions. This point is frequently overlooked in studies of therapy evaluation. Sometimes data from several investigators are pooled without regard to differences in the definitions used on such important matters as types of cases included, basis for "cure" or for "failure," and the like. Sometimes comparisons of results for two schedules of treatment are made when there are important differences in definitions and, hence, in the patient populations involved. By establishing a single set of definitions, used by all investigators for all schedules of therapy, this problem, it is believed, has been overcome in the present study.

Another problem in evaluating antisyphilitic therapy is that of distinguishing between relapse and reinfection. The reinfection rate should vary directly with the effectiveness of treatment and inversely with the relapse or progression rate. Therefore, a certain amount of inconsistency is introduced when a type of therapy is evaluated on the basis of a "re-treatment rate" which combines failures (resulting from ineffective therapy) with reinfections (occurring when treatment is effective). From the public health point of view, perhaps, this is a moot point since both reinfections and relapses are recurrences of the disease and, as such, could be considered as "public health failures." Because of the difficulty (if not the frequent impossibility) of distinguishing relapses from reinfections, we use the cumulative re-treatment rate to evaluate therapy. As a guide to the reason for failure, we subdivide re-treated cases into clinical relapses, probable reinfections, and serologic failures. (For an example, see table 4 in *Results of Therapy*, pages 362–363 of this issue.) Since the patients treated with the various schedules of therapy compared in this study come from the same geographic areas and cultural groups, the problem of varying reinfection rates due to varying prevalence rates or different behavior patterns should be minimum.

Variability in laboratory procedure, performance, and types of tests is another source of possible error in therapy evaluation. In this study, the adoption of the Kahn standard quantitative test and the efforts made to standardize laboratory procedure and performance have tended to minimize differences from this source.

The important problem of patients lapsing from observation was highlighted by Iskrant, Bowman, and Donohue (*1*). Their paper on statistical methods of analyzing the results of antisyphilitic therapy points out two types of lapses—temporary and permanent.

In temporary lapses, where the patient returns for examinations after missing one or more scheduled observations, avail-

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## Table 1.—*Method of calculating cumulative re-treatment rates* [1]

| Observation period (months) | Total observed this period or later | Percent observed | Cases re-treated | Re-treated cases carried forward | Adjusted total cases observed | Cases re-treated | | Cases not re-treated | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Seropositive | | Seronegative | |
| | | | | | | Percent | Cumulative percent | Number | Percent | Number | Percent |
| | (*a*) | (*b*) | (*c*) | (*d*) | (*e*) | (*f*) | (*g*) | (*h*) | (*k*) | (*m*) | (*o*) |
| 0–1 | 967 | 100.00 | 1 | 0.000 | 967.000 | 0.1 | 0.1 | 958 | 99.1 | 8 | 0.8 |
| 1–2 | 949 | 98.24 | 4 | .982 | 949.982 | .4 | .5 | 877 | 92.3 | 68 | 7.2 |
| 2–3 | 933 | 98.73 | 3 | 4.919 | 937.919 | .3 | .8 | 713 | 76.0 | 217 | 23.1 |
| 3–4 | 909 | 97.74 | 11 | 7.740 | 916,740 | 1.2 | 2.0 | 547 | 59.7 | 351 | 38.3 |
| 4–5 | 878 | 97.77 | 15 | 18.322 | 896.322 | 1.7 | 3.7 | 463 | 51.7 | 400 | 44.6 |
| 5–6 | 852 | 98.73 | 17 | 32.899 | 884.899 | 1.9 | 5.6 | 323 | 36.5 | 512 | 57.9 |
| 6–7 | 823 | 98.56 | 16 | 49.180 | 872.180 | 1.8 | 7.4 | 267 | 30.6 | 540 | 61.9 |
| 7–8 | 793 | 98.27 | 7 | 64.052 | 857.052 | .8 | 8.2 | 221 | 25.8 | 565 | 65.9 |
| 8–9 | 769 | 97.84 | 9 | 69.517 | 838.517 | 1.1 | 9.3 | 189 | 22.5 | 571 | 68.1 |
| 9–10 | 742 | 97.63 | 6 | 76.656 | 818.656 | .7 | 10.0 | 162 | 19.8 | 574 | 70.1 |
| 10–11 | 729 | 99.05 | 5 | 81.871 | 810.871 | .6 | 10.6 | 137 | 16.9 | 587 | 72.4 |
| 11–12 | 717 | 99.03 | 11 | 86.028 | 803.028 | 1.4 | 12.0 | 111 | 13.8 | 595 | 74.1 |
| 12–15 | 687 | 97.31 | 11 | 94.418 | 781.418 | 1.4 | 13.4 | 85 | 10.9 | 591 | 75.6 |
| 15–18 | 660 | 97.63 | 5 | 102.920 | 762.920 | .7 | 14.1 | 72 | 9.4 | 583 | 76.4 |
| 18–21 | 644 | 98.32 | 9 | 106.107 | 750.107 | 1.2 | 15.3 | 57 | 7.6 | 578 | 77.1 |
| 21–24 | 617 | 97.17 | 1 | 111.849 | 728.849 | .1 | 15.4 | 45 | 6.2 | 571 | 78.3 |
| 24–30 | 551 | 89.45 | 2 | 100.943 | 651.943 | .3 | 15.7 | 34 | 5.2 | 515 | 79.0 |
| 30–36 | 412 | 75.05 | 4 | 77.259 | 489.259 | .8 | 16.5 | 22 | 4.5 | 386 | 78.9 |
| 36–42 | 287 | 70.34 | 2 | 57.158 | 344.158 | .6 | 17.1 | 16 | 4.6 | 269 | 78.2 |
| 42–48 | 205 | 71.93 | 0 | 42.552 | 247.552 | .0 | 17.1 | 7 | 2.8 | 198 | 80.0 |
| 48–54 | 110 | 53.36 | 1 | 22.833 | 132.833 | .8 | 17.9 | 7 | 5.3 | 102 | 76.8 |
| 54–60 | 26 | 23.85 | 0 | 5.684 | 31.684 | .0 | 17.9 | 1 | 3.2 | 25 | 78.9 |

(*a*) This number does not include cases re-treated prior to this period.
(*b*) The formula for the percent observed is as follows:

$$b_n = \frac{a_n}{a_{(n-1)} - c_{(n-1)}} \times 100 \text{ where } a_n = \text{entry in column } a \text{ for period n,}$$

$a_{(n-1)}$ = entry in column *a* for the period prior to n
$c_{(n-1)}$ = entry in column c for the period prior to n

(*c*) The actual number of cases re-treated in each period.
(*d*) The formula for the entry in column (*d*) for any period "*n*" is as follows:

$$d_n = b_n \left( \frac{c_{(n-1)} + d_{(n-1)}}{100} \right)$$

(*e*) Adjusted total cases equal the sum of entries in columns (*a*) and (*d*) for any period.

(*f*) Percentage (*c*) is of (*e*).
(*g*) Cumulated percentages of (*f*).
(*h*) Number of cases actually observed in period which exhibited a positive blood test plus the number of cases not seen this period but considered seropositive on the basis of subsequent observation.
(*k*) The percentage (*h*) is of (*e*).
(*m*) The number of cases actually observed in the period which exhibited negative blood test plus the number of cases not seen in this period but considered seronegative on basis of subsequent observation.
(*o*) The percentage (*m*) is of (*e*).

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[1] The data presented in the sample table are for research patients with secondary syphilis (no previous treatment for syphilis) as reported in *Results of Therapy* (page 359 in this issue).

able information permits interpolation as to the probable result of the serologic test during the period of lapse. Since it was found that interpolation for missing observations gave accurate results, this method has been used in the present study for the small number of missed observations (about 10 percent of 28,000 scheduled observations).

Permanent lapses, in which the case is lost from study, have presented a serious statistical problem. Any method of calculating re-treatment rates must take these losses into account. Of the several methods described by Iskrant et al. (*1*), only two adjusted satisfactorily for losses from observation; the first method which they described, and which was developed by them, is used in the present study. In this method, as well as in others attempting to adjust for patients lost from observation, it is assumed that the patients lost would have had the same experience as those who remained under observation.

Having made this assumption, one cannot ignore the lapsed cases in calculating the re-treatment rate. With regard to patients who have been re-treated, the result of therapy is known for the remainder of the study. Patients who have not been re-treated at any given period, however, can become lost to the study before their status is finally determined. Therefore, either the number of re-treated cases must be adjusted upward for "failures" among those lost to the study, or the total used for computing the re-treatment rate must be adjusted to include only the same proportion of re-treated as non-re-treated patients remaining under observation.

A problem similar to permanent lapses occurs with patients who were treated more recently than others and therefore have not had the opportunity to be observed for the complete follow-up period (5 years in this study). Such cases are in a sense lost to observation since they drop from follow-up at various observation periods just as do lapses from observation. The technic of adjustment and the assumption made are the same regardless of whether patients were lost from observation because they lapsed or because they did not have the opportunity to be observed longer.

The technic used in calculating the results of therapy is shown in table 1. As an example of the technic, results of therapy have been calculated for secondary syphilis cases with no previous treatment for syphilis, as presented in table 3 of the previous report, ***Results of Therapy*** (page 361 of this issue). The fundamental concept in this technic is the adjustment of the total cases observed so as to include the same proportion of re-treated as non-re-treated patients remaining under observation for a given period. The method of calculating this adjustment is as follows:

The percentage observed is calculated by dividing the number observed in a given observation period by the number observed in the previous period less the cases re-treated in the previous period (see footnote (*b*), table 1). This percentage observed is applied to the number of re-treated cases carried forward including those re-treated in the previous period (footnote (*d*), table 1). The resulting adjustment is added to the actual number of cases observed in "this" period or later.

A simplified method of calculating the adjusted total of cases observed[4] involves multiplying the percentage observed in a given period by the adjusted total of cases observed in the previous period to obtain the adjusted total of cases observed in "this" period. Employing the notations used in table 1, the simplified method may be expressed as:

$$e_n = \frac{b_n \; e_{(n-1)}}{100}$$

or

$$e_n = \frac{a_n \; e_{(n-1)}}{a_{(n-1)} - c_{(n-1)}}$$

The adjusted total of cases observed in the first period is always equal to the actual total observed in this period ($a_1 = e_1$). This simplification makes the calculation for column (*d*) in table 1 unnecessary.

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[4] This simplification was developed by Bernard E. Young, Statistician, Division of Venereal Disease.

The percentage re-treated in "this" period is calculated by dividing the number of cases re-treated in "this" period by the adjusted total cases observed. The cumulative re-treatment rate is obtained by adding each individual period-rate to the rate cumulated through the previous period. The percentage seropositive and percentage seronegative are obtained by dividing the number of cases in each of these categories by the adjusted total cases observed. In this way 100 percent (except for slight variations which sometimes occur in carrying out decimals) of the cases in each period are distributed among positive, negative, and re-treated.

In the statistical comparison of the re-treatment or seronegativity rates for two schedules, it is desirable to have a method of testing for statistical significance which is easily amenable to clerical computation. Basically, it is assumed in these tests that we are sampling from defined populations, that the samples are representative of the population (thus unbiased), and that the arithmetic means of all possible samples are normally distributed. Unfortunately, three main sources of sampling error seriously complicate the calculation of the standard error of the mean of the cumulative re-treatment rates for a given treatment schedule. These sources are identified as random error resulting from (*a*) sampling of treatment facilities, (*b*) sampling of patients for treatment on a given schedule, and (*c*) sampling of patients in each posttreatment period within a given schedule.

The method used in this study to test the significance of differences in results between schedules is described and exemplified in table 2. Two cumulative re-treatment rates presented in the previous paper on results of therapy are compared. Using the null hypothesis (i. e., that the patients treated with these two schedules were taken from the same population with respect to treatment results), it is assumed that the best estimate of the standard error of the mean in both samples is obtained by pooling the results for the two samples. Computing "*t*" and using as the standard of significance a probability of 1 out of 20 (P=0.95 and $t=2.0$), we find that the difference between the rates is not significant, and the result is not inconsistent with the hypothesis that the two samples were drawn from the same population. The Chi-square method is frequently used as an alternative and the

**Table 2.—*Method of testing for significance of difference between cumulative re-treatment rates***

| | Adjusted total cases at 21–24 months | Cumulative percent re-treated at 21–24 months |
|---|---|---|
| 2,800,000 units penicillin alone | 160 | 18.0 |
| 2,800,000 units penicillin with arsenoxide and bismuth | 178 | 15.6 |

$$p_0 \text{ (weighted mean proportion)} = \frac{n_1 p_1 + n_2 p_2}{n_1 + n_2} = \frac{160 \times 18.0 + 178 \times 15.6}{160 + 178} = 16.7 \text{ percent}$$

$$q_0 = 100 - p_0 = 83.3$$

$$\sigma D_p = \sqrt{p_0 q_0 \left( \frac{1}{n_1} + \frac{1}{n_2} \right)} = \sqrt{16.7 \times 83.3 \left( \frac{1}{160} + \frac{1}{178} \right)} = 4.1$$

$$t = \frac{p_1 - p_2}{\sigma D_p} = \frac{18.0 - 15.6}{4.1} = 0.6 < 2.0$$

$\therefore$ Difference is not significant at level $P = 0.95$.

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Formulas adapted from Mills, *Statistical Methods* (3).

same conclusions are reached. The reader has probably observed that this method results only in an approximation of the error and might be subjected to considerable refinement. Up to this time it has been found by the authors to be the only practicable method.

One problem previously referred to is the validity of the assumption that patients lost from observation have the same experience as those remaining under observation. In a recent paper (2) the authors discussed this problem in a detailed analysis. The conclusion reached is that within the limits of from 42- to 100-percent follow-up over a 2-year period, patients lost to study had the same experience as those remaining and that no bias in results occurs from the loss of some patients to follow-up.

It should be clear that even though bias is not present, the lower the percentage followed for 2 years the greater the probability that the resulting cumulative re-treatment rate may vary widely from the true rate for all patients in a study, depending on the "chance" factors operating to cause a patient to lapse from observation. In other words the absence of bias does not preclude an occasional poor estimate of the re-treatment rate, and the smaller the percentage followed the greater the probability of a poor estimate.

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2. Iskrant, A. P.; Remein, Q. R.: Do persons lost to long-term observation have the same experience as persons observed? To be presented on December 28, 1951, at the annual meeting of the American Statistical Assn.
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## IV. Case Holding for Posttreatment Observation

Lida J. Usilton [1] and Robert Lugar [2]

One of the objectives of the research study previously described in this issue of The Journal of Venereal Disease Information was posttreatment observation of 100 percent of selected patients. The present paper describes the special methods of case holding used to obtain a high level of posttreatment observation and the degree of success which has been achieved.

In the older routine arsenical schedules of treatment, case holding was a problem of major importance: approximately 75 percent of patients beginning treatment for early syphilis lapsed before receiving minimum protective therapy. The introduction of penicillin as the drug of choice in syphilis therapy and its administration in hospitals or rapid treatment centers solved the problem of holding cases to treatment. Case holding for posttreatment observation in therapy evaluation, however, remains a serious problem in research studies conducted outside the laboratory. In other therapy evaluation studies conducted by the Division of Venereal Disease the lapse rate has varied from 30 to 70 percent by the end of 2 years. Because much concern has been felt as to the accuracy of conclusions reached with such high lapse rates, this study included special provision for the goal of 100-percent follow-up.

### Method

The case-holding method usually employed by the Division of Venereal Disease in therapy-evaluation studies consists of two principal procedures: educating the patient in the importance of posttreatment observation before his discharge from the treatment facility; and sending form letters to remind the patient when examinations are due. Only rarely does a representative of the health department visit the patient. Thus, in this routine method, follow-up is conducted almost entirely on an impersonal basis.

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The method used in this research study involves selection of patients and personal contact of the treating facility with the patient through a research investigator. Much is learned about the patient's qualifications for the study while he still is under treatment. Patients are tentatively selected on the basis of interviews by the medical officer in charge of the treating facility and by the investigator. If subsequent appraisal of the patient and the information given by him verify the belief that he is a good prospect for long-term follow-up, he is finally selected for the study just prior to discharge from treatment.

In any case-holding program, there always is a small group of patients who present special problems. Because a patient's character cannot always be read accurately in advance, some members of this group found their way into the Blue Star Study. A chief characteristic of these problem patients is their mobility; they seem to have no roots in any community. Some also may be disturbed, distrustful, and averse to work. The investigator usually finds that no amount of time and effort will establish rapport between himself and a patient with these qualities. Uninterested in his own health and that of other persons, he is unresponsive to all urging to return to a treatment center for examination. Obviously, such a patient is not a promising selection for a research study with a goal of 100-percent follow-up. To even the most determined investigator, this small group is a challenging problem.

After patients are selected, the task of holding them to observation for the posttreatment period (a minimum of 5 years, but preferably for the life of the patient) becomes the responsibility of the investigator. Obviously, assignment of an investigator to the treatment facility does not in itself insure that patients selected for study will continue to return for follow-up observation. As time passes, patients begin to lose interest in their disease and in the purposes of the study, and other approaches are necessary to secure their continued cooperation. In this study, the approach has been to build a personal relationship between the investigator and the patient. Probably no single method of engendering and maintaining this relationship can be considered "best" because much depends upon the aptitudes of the individual investigator and upon his and the patient's personality. One investigator's method is to demonstrate to the patient that the investigator can and will aid him—as a research patient—in solving some of his problems.

At a minimum, the investigator must keep in personal touch with the patient, must know where he can be located, and must make it as easy as possible for him to keep appointments for examinations. This means informal interviews with the patient from time to time; it also means keeping him advised of results of tests and repeatedly "selling" him on continuing with the program. The investigator also should assist, where necessary, in providing transportation to the facility and in arranging appointments at hours convenient to the patient.

The investigator must always realize that patients have lives outside the treatment center. To maintain the cooperation of 100 patients, the investigator must deal not only with 100 individuals but also with their home situations, their friends, and a variety of other relationships.

### Results of Case-Holding Procedures

To date, investigators have been very successful in holding patients to observation, as shown in table 1. Of the 1,538 patients selected at the 12 treatment facilities, 89.6 percent are still under observation. A total of 28,034 examina-

**Table 1.**—*Posttreatment observation success with research patients receiving intensive follow-up*

[As of May 1951]

| Treatment facility | Patients selected to date | Number of patients lost from observation | | | | Patients still under observation | | Observations | | | Average length of observation (months) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Total | Lapsed[1] | Closed[2] | Died | Number | Percent | Number scheduled | Completed | | |
| | | | | | | | | | Number | Percent | |
| A | 59 | 2 | 2 | 0 | 0 | 57 | 96. 6 | 1, 055 | 1, 001 | 94. 9 | 31. 2 |
| B | 129 | 7 | 5 | 1 | 1 | 122 | 94. 6 | 2, 435 | 2, 333 | 95. 8 | 42. 7 |
| C | 322 | 20 | 14 | 1 | 5 | 302 | 93. 8 | 4, 598 | 4, 297 | 93. 5 | 24. 6 |
| D | 170 | 11 | 4 | 2 | 5 | 159 | 93. 5 | 3, 437 | 3, 209 | 93. 4 | 44. 7 |
| E | 134 | 9 | 7 | 2 | 0 | 125 | 93. 3 | 2, 747 | 2, 539 | 92. 4 | 46. 4 |
| F | 96 | 7 | 4 | 2 | 1 | 89 | 92. 7 | 1, 509 | 1, 454 | 96. 4 | 27. 8 |
| G | 25 | 2 | 1 | 0 | 1 | 23 | 92. 0 | 407 | 377 | 92. 6 | 27. 2 |
| H | 134 | 12 | 5 | 7 | 0 | 122 | 91. 0 | 2, 608 | 2, 475 | 94. 9 | 40. 8 |
| I | 131 | 16 | 12 | 3 | 1 | 115 | 87. 8 | 2, 614 | 2, 529 | 96. 7 | 46. 7 |
| J | 153 | 27 | 18 | 6 | 3 | 126 | 82. 4 | 2, 809 | 2, 271 | 80. 8 | 36. 5 |
| K | 109 | 26 | 22 | 2 | 2 | 83 | 76. 1 | 2, 218 | 1, 786 | 80. 5 | 43. 4 |
| L | 76 | 21 | 17 | 3 | 1 | 55 | 72. 4 | 1, 597 | 1, 169 | 73. 2 | 48. 6 |
| Total | 1, 538 | 160 | 111 | 29 | 20 | 1, 378 | 89. 6 | 28, 034 | 25, 440 | 90. 7 | 37. 7 |

[1] Last 2 scheduled observations not performed.

[2] Reason for closing cases:
21—Schedule used at re-treatment was unacceptable.
6—Patient was re-treated in error.
2—Patient received large amounts of penicillin for nonsyphilitic conditions.

tions were scheduled to be performed on these patients, and 25,440 (90.7 percent) have been completed. Some investigators have been more successful than others (and undoubtedly more fortunate) in holding their patients. The percentage of patients still under observation varies from 96.6 to 72.4 percent among the several facilities, and the percentage of scheduled observations completed varies from 96.7 to 73.2 percent. Differences between facilities in follow-up success appear to be almost unrelated either to the number of selections or to the length of time patients have been under observation. Several facilities with poor results had frequent changes in investigators which broke continuity of contact between investigator and patients. In general, the differences in follow-up success appear to be more closely associated with the ability of the investigator(s) and with the problems peculiar to a facility.

A total of 160 patients have been lost from observation. Only 49 of this number, however, finally have been classified as lost—20, because the patients have died, and 29, because the cases were closed by administrative decision. Twenty-one of these 29 cases were closed after re-treatment because the re-treatment schedule did not meet the requirements of the study. Six cases were closed because re-treatment was given in error. Four of these 6 were re-treated by other facilities unaware of the patient's treatment status; 2 were misdiagnosed as serologic relapses, i. e., re-treated before confirmation of relapse by second serologic test. Two cases were closed early in the study because the patients had received large amounts of penicillin for other conditions after treatment for syphilis. The other 111 patients, who have been considered lost because the last two scheduled examinations were not performed, eventually may be returned to observation.

## Discussion

Experience with the research study to date suggests that two factors have been of primary importance in its case-holding results. The first and most significant of these factors is the competence of the research investigator, standing as he does as the link between the patient and the treating facility. The second factor is the continuous support and interest, medical and administrative, which the study has received. This support has been forthcoming from the Division of Venereal Disease, participating treatment facilities, and from physicians and clinics all over the country. The latter have frequently cooperated in examining patients who were out of the vicinity of the treating facility at times when observations were scheduled.

No formula can be prescribed for a successful research investigator. Nevertheless, because experience gained in this study may be of value in other areas where case holding is important, it seems desirable to set forth some of the definable qualities which, in Blue Star experience, contribute to case-holding success.

1. Interest in the study. This means a thorough appreciation of the importance of long-term follow-up in evaluating a treatment method. It also means awareness of each patient as a part of the evaluation picture. And it further means acceptance of the case-holding method—building a personal relationship with patients—and ability to apply the method to serve the purposes of the study.

2. Substantive knowledge of syphilis. Patients will ask questions about their disease, and the investigator should be prepared to interpret the technical terms of the physician to them. This implies considerable orientation in the clinical, laboratory, and epidemiologic aspects of syphilis control.

3. Willingness to adapt hours of work to the patient's needs and convenience.

4. Acceptance of the patient as he is, with no demands upon him except those which serve the purposes of the study.

5. Knowledge of the community. This means maintenance of contacts with health, welfare, law enforcement, and other community agencies; knowledge of the character of different sections and neighborhoods of the community; and acquaintance with persons and places frequented by the patient.

6. Resourcefulness. Dealing as he does with a variety of problems and personalities, the investigator can follow no single course of action either in maintaining his relationships with patients or in locating patients when examinations are due. Both of these aspects of the investigator's work require imagination, insight into the patient's personality, and a capacity to act in many kinds of situations.

7. Tact, persuasiveness, intelligence, and reliability in dealing with patients. Here, we touch upon some of the personality traits of the investigator which are at the base of his success. Such traits are the least standardized but perhaps the most significant elements of the investigator's equipment.

Behind the case-holding results achieved in this study lie the planning and support which established and sustain it. It is our opinion that investigators derive a very strong advantage from their assignment to a single, long-term project. They have had no duties except holding research patients to observation. Thus, they have been able to turn their energies, talents, and time to a single end. We believe that the results of the study reflect the soundness of that feature of the study plan. It should also be added that support of the study, in terms of continuity of interest and financial backing has never flagged. The original conviction that the study was important to syphilis control and that case holding was basic to the study's success has persisted and undoubtedly has contributed to the record reported in this paper.

## Summary

1. One objective of this long-term evaluation of penicillin therapy for syphilis was posttreatment observation of 100 percent of research patients. This objective was desirable because some have felt that conclusions may be inaccurate in studies where only 30 to 70 percent of treated cases are held to posttreatment observation.

2. The method used to achieve this goal consists of careful selection of patients and development of a personal relationship between the patient and the research investigator.

3. Over an average of 37.7 posttreatment months, 89.6 percent of selected patients are still under observation and 90.7 percent of scheduled observations have been completed.

# CURRENT NOTES AND REPORTS

## Venereal Disease Symposium

The Annual Venereal Disease Symposium on "Recent Advances in the Study of the Venereal Diseases," will be held May 1–2, 1952, in the Auditorium of the Federal Security Building, Washington, D. C. This symposium will again be under the joint auspices of the Experimental Therapeutics Study Section of the National Institutes of Health and the American Venereal Disease Association, and will be held in conjunction with the fourteenth annual meeting of the Association.

Investigators having suitable material are urged to submit papers for consideration by the joint committee for the program. Titles of papers proposed along with the list of authors in proper sequence and a brief abstract (maximum 200 words) should be sent to: Dr. J. E. Moore, 804 Medical Arts Building, Baltimore 1, Md., and Dr. William L. Fleming, 750 Harrison Avenue, Boston 18, Mass. The deadline for receipt of titles and abstracts will be January 15, 1952.

Further information about the symposium may be obtained from Dr. Frederick W. Appel, Executive Secretary, Experimental Therapeutics Study Section, National Institutes of Health, Bethesda, Md., or Dr. Fleming, Secretary of the American Venereal Disease Association, at the above address.

# CURRENT LITERATURE

NOTE: Current bibliographic information of the type that has appeared regularly in this section of THE JOURNAL will continue to be available to all interested persons upon their written request to the Chief of the Division of Venereal Disease. In addition, bibliographies on specific topics relating to the venereal diseases can be supplied from the Division's files, which include information dating back to 1920.

## A. M. A. ARCH. PATH., CHICAGO

Lesions of the vasa vasorum and dissecting aneurysms of the aorta. Analysis of incidence, etiological aspects, pathogenesis, and pathological changes. Joseph F. McCloskey and Philip T. Chu. A. M. A. Arch. Path., 52: 132–144, Aug. 1951.

The authors review the literature on dissecting aneurysms of the aorta, discussing the incidence, etiologic aspects, and the pathogenesis of the disease in general. Included among the etiologic processes is syphilis, which is the most frequently incriminated inflammatory lesion reported. Recent investigations, however, do not show any considerable difference in the incidence of dissecting aneurysm among syphilitic and nonsyphilitic patients. The present report deals with seven cases of dissecting aneurysm in which autopsy was performed at the Jefferson Medical College during the period 1947 to 1949. Particular reference is made to the alterations of the vasa vasorum.

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## ACTA DERMAT.-VENEREOL., HELSINKI

Problems in the therapy of early syphilis. Charles R. Rein. Acta dermat.-venereol., 31: 16–29, 1951. (Supplement 24.)

Early problems in the penicillin therapy of syphilis which have caused many physicians to believe that penicillin alone is unsatisfactory are discussed. From a review of the literature, the majority of the reports place penicillin as the drug of choice. Administration of penicillin alone results in rapid disappearance of *Treponema pallidum* from lesions, rapid healing of skin and mucous membrane lesions, reversal to seronegativity of serologic tests in more than 90 percent of the patients during the first 2 years following therapy, and the completion of therapy on an ambulatory basis in the majority of patients.

Clinical results and by-effects in early syphilis with combined arsenical-bismuth treatment. Povl Møller. Acta dermat.-venereol., 31: 30–41, 1951. (Supplement 24.)

The disadvantages of the treatment of syphilis with arsenicals and bismuth are the possibilities of by-effects and insuring that the patient will complete his treatment. The extent to which these two aspects affect Scandinavian countries is discussed. Evidence gathered from 625 patients treated in Copenhagen between 1940 and 1945 showed that 75 percent had no serious by-effects and 75 percent completed the course of treatment. Of 19 relapses which occurred, 7 were probably reinfections.

The value of penicillin alone in the prevention and treatment of congenital syphilis. Norman R. Ingraham, Jr. Acta dermat.-venereol., 31: 60–88, 1951. (Supplement 24.)

A study on the outcome of pregnancy in 1,959 women with syphilis is presented. The most practical tested course of treatment for average use consisted of 600,000 units procaine penicillin in oil with 2 percent aluminum monostearate once daily for 10 days. In 267 women treated for more than 10 weeks with arsenicals, results were similar to the penicillin group. Because of lack of toxicity, ability to cure in utero the infected fetus, and the ease of administration and short duration of therapy, penicillin is the preferred treatment. Treatment of congenital syphilis is also discussed.

A follow-up study of the results of treatment in children with congenital syphilis at the Welander Home, Stockholm, between 1900 and 1950. Preliminary report. Einar Hollström. Acta dermat.-venereol., 31 : 89–95, 1951. (Supplement 24.)

During 50 years, 500 children had been admitted to the home, created in 1900 by Edward Welander as a specialty hospital and a school and home for children with congenital syphilis. Of the 500, 327 presented definite signs of congenital syphilis. Forms of therapy have kept pace with progress in the field of medicine. The first children admitted to the home were treated with mercury. In recent years penicillin has been used. Results of treatment with the various preparations are tabulated.

Diagnostic and therapeutic problems in neurosyphilis. Bernhard Dattner. Acta dermat.-venereol., 31 : 111–119, 1951. (Supplement 24.)

Since neurosyphilis comprises a variety of clinical syndromes, any attempt to classify the disease according to clinical signs and symptoms is difficult. The importance of the spinal fluid test in both the diagnosis and treatment is stressed. No syphilologist is able to deal with his patients successfully without a proper understanding and evaluation of the spinal fluid syndromes.

Febrile Herxheimer reaction in neurosyphilis. Tauno Putkonen and Katri Rehtijärvi. Acta dermat.-venereol., 31 : 120–132, 1951. (Supplement 24.)

The febrile Herxheimer reaction was studied in 229 patients with neurosyphilis by administering an initial therapeutic dose of at least 100,000 units penicillin and recording the temperature of the patients at hourly intervals. Factors influencing the reaction were previous treatment, diagnostic type of neurosyphilis, and abnormalities of the cerebrospinal fluid. Patients with dementia paralytica without previous treatment showed a febrile response.

Problems in the serodiagnosis of syphilis. Charles R. Rein. Acta dermat.-venereol., 31 : 141–151, 1951. (Supplement 24.)

Serodiagnostic tests for syphilis employing purified antigens are valuable to the physician in establishing or excluding a syphilitic infection. The physician must be aware of the limitations inherent in the currently employed tests such as false-negative and false-positive reactions. Properly interpreted quantitative tests may be of value to the physician as a guide to response to treatment, a means of differentiating between serologic relapse and reinfection, to determine reagin fastness or seroresistance, and to differentiate between true- and false-positive serologic reactions for syphilis.

Problems in the preparation and use of cardiolipin antigens. Mary C. Pangborn. Acta dermat.-venereol., 31 : 152–166, 1951. (Supplement 24.)

Cardiolipin antigens are mixtures of cardiolipin, lecithin, and cholesterol. The problem of producing purified antigen is to secure adequate purification of cardiolipin and lecithin. Sensitivity and specificity depend not only on purity but on proper balance of the three components. The same principles apply to flocculation tests. When well-adjusted antigens are used, highly satisfactory levels of sensitivity and specificity are obtained in various types of serologic technics.

The Wassermann reaction carried out with cardiolipin and crude antigens. Th. M. Vogelsang. Acta dermat.-venereol., 31 : 167–174, 1951. (Supplement 24.)

Investigations carried out at Gade's Institute on 30,000 serums showed that the Wassermann test using cardiolipin antigen revealed a sensitivity inferior to the Meinicke clarification test and the Wassermann with a crude antigen but was more sensitive than the Kahn standard test. When specificity is considered, the cardiolipin antigen is recommended and is regarded as a definite advance in the serology of syphilis.

AM. J. CLIN. PATH., BALTIMORE

Gummatous syphilitic splenomegaly. Report of a case. O. Harmos and M. E. Myers. Am. J. Clin. Path., 21: 737–742, Aug. 1951.

A case of acquired gummatous splenomegaly in a 23-year-old Negro veteran, admitted to the U. S. Marine Hospital, Cleveland, Ohio, is described. After surgical removal of the spleen, the patient made a good recovery, was given antisyphilitic treatment, and was asymptomatic 3 years later. Presence of reticular fibers in the gumma helped in distinguishing it from tuberculous granuloma.

AM. J. M. TECHNOL., HOUSTON

Recent advances in parasitological diagnostic technics. H. Elishewitz. Am. J. M. Technol., 17: 165–189, July–Aug. 1951.

In this lecture, delivered to the Second State Seminar, Illinois Medical Technologists Association, Mt. Sinai Hospital, Chicago, Ill., March 4, 1951, the author reviewed some of the outstanding advances made in the diagnostic field during the past several years. A review of the cultural methods as a routine diagnostic procedure in isolating *Trichomonas vaginalis*, and the use of Thedan blue in staining blood smears of organisms, including syphilitic spirochetes, are included in the discussion.

AM. J. OBST. & GYNEC., ST. LOUIS

Granuloma venereum of the cervix and vulva. Lawrence L. Hester, Jr. Am. J. Obst. & Gynec., 62: 312–320, Aug. 1951.

After a brief review of the history and problems of diagnosis, the author presents a report on 45 cases of granuloma inguinale seen during the past 3 years among 6,078 patients at the Gynecological Clinic of the Medical College of the State of South Carolina. All the patients were successfully treated with a total dose of 20 gm. of streptomycin for periods of 5 or 10 days. To the present time there have been no relapses and no recurrences, some of the patients having been followed for 2½ years.

Aureomycin in the therapy of *Trichomonas vaginalis* vaginitis. Robert B. Greenblatt and William E. Barfield. Am. J. Obst. & Gynec., 62: 423–426, Aug. 1951.

This paper presents results of aureomycin therapy, with various methods of administration, in 53 patients with acute vaginitis due to *Trichomonas vaginalis*. Results showed that trichomonads were absent in the vaginal secretions of 47 (97.8 percent) of 48 patients who were examined during the first week of therapy. Immediate relief of pruritus and cessation of leucorrhea were reported by 37 (77.1 percent) of 48 patients, and no recurrence was found in 29 (78.3 percent) of 37 patients during a 1-month follow-up examination.

AM. J. OPHTH., CHICAGO

The present status of ACTH and cortisone in clinical ophthalmology. Alan C. Woods. Am. J. Ophth., 34: 945–960, July 1951.

A review of the literature on the use of ACTH and cortisone in various ophthalmologic conditions, including syphilitic interstitial keratitis, is given. The author assembles the evidence now at hand, discusses the various differences in the observations of different investigators, and reports certain observations on the administration of these agents.

Aureomycin as prophylaxis against ophthalmia neonatorum: second series. Arthur M. Culler and Samuel G. Clark. Am. J. Ophth., 34: 982–984, July 1951.

The authors summarize the results of a study of 2,957 newborn babies in whom aureomycin was instilled once at birth as prophylaxis against ophthalmia neonatorum. During the first 7 days of life, 1.2 percent of these infants showed significant discharge from the eyes. The range of organisms encountered embraced all of the most common contaminations, and vision was never seriously endangered. It is suggested that a single instillation of 0.5 percent aureomycin at birth be used in all hospital deliveries where close observation can be maintained, bacteriologic studies made when infection occurs, prompt treatment instituted when it is indicated, and in those States where the form of prophylaxis is not now specified by law.

### AM. J. PHARM., PHILADELPHIA

The world health, market and political implications of international research. Delmas K. Kitchen. Am. J. Pharm., 123: 194–202, June 1951.

This is a general discussion on some of the health problems confronting the world today. Syphilis, though markedly decreasing in the United States, is said to infect an estimated 50 million people in the world, exacting about 2 million deaths, and resulting in about 1 million babies with congenital syphilis.

### AM. PRACT. & DIGEST TREAT., PHILADELPHIA

Laboratory and clinical studies on terramycin. Ellard M. Yow, Daniel E. Jenkins, Henry E. Mendell, Ray H. Skaggs, and Harold R. Hipp. Am. Pract. & Digest Treat., 2: 689–693, Aug. 1951.

Development and use of terramycin in the treatment of various infections, including the venereal diseases, are reviewed. In a study of 60 patients with various diseases at three Houston, Tex., hospitals, favorable results were obtained in 5 patients with lymphogranuloma venereum, and 1 with granuloma inguinale. Unfavorable response was obtained in 1 patient with granuloma inguinale.

### BOL. ASOC. MÉD. PUERTO RICO, SAN JUAN

The use of typhoid vaccine in a continuous intravenous infusion for the treatment of eye diseases. Roberto Buxeda. Bol. Asoc. méd. Puerto Rico, 43: 410–436, Aug. 1951.

Historic development of a method for the administration of typhoid vaccine intravenously in the treatment of eye diseases, including ophthalmia neonatorum, is reviewed. Case histories of 10 patients with various eye diseases are presented. Two of the patients had a history of gonorrhea.

### BRIT. J. RADIOL., LONDON

Gumma of lung. G. Hollingsworth. Brit. J. Radiol., 24: 467–468, Aug. 1951.

A case report is presented of a 69-year-old male patient with a plaque-like induration involving the subcutaneous tissues and muscle of the right calf. It was thought to be a granuloma, and a routine chest X-ray was made which revealed lesions at the right base of the lung considered to be gummatous. A positive Wassermann reaction was obtained, and syphilitic infection 50 years previously was admitted. Therapy was instituted which resulted in marked resolution of the gumma of the lung. The lesion of the leg showed comparable improvement.

### BRIT. J. VEN. DIS., LONDON

The VDRL tube flocculation test. A macroflocculation test for syphilis using cardiolipin-lecithin-cholesterol antigen. T. M. Vogelsang and Rina Haaland. Brit. J. Ven. Dis., 27: 52–58, June 1951.

In this study, comparative investigations were made in 15,416 serums at the Gade's Institute, Bergen, Norway, with the VDRL tube flocculation test, the Wassermann reaction, a complement-fixation test using cardiolipin-lecithin-cholesterol antigen, and the Meinicke clarification test. The results showed the VDRL test to have a satisfactory sensitivity and a very good specificity. It is easy to carry out, and the difference between negative and positive results depends only slightly upon the personal judgment of the investigator.

Radiology in syphilis. K. Harvey Gaskell. Brit. J. Ven. Dis., 27: 59–74, June 1951.

Radiograph features encountered in congenital syphilis, adult bone syphilis, and adult soft tissue lesions of syphilis by the practising radiologist today are briefly summarized. Illustrations and brief case histories of 26 patients are presented.

Current methods in the treatment of venereal diseases in France. Pierre Durel. Brit. J. Ven. Dis., 27: 75–91, June 1951.

In this paper, based upon a review of the literature and personal observations, the author discussed standard and less usual technics of treatment of syphilis, chancroid, lymphogranuloma venereum, and gonorrhea in France and compared these technics with those used in the United States.

Treatment of gonorrhoea with streptomycin. R. R. Willcox. Brit. J. Ven. Dis., 27: 92–94, June 1951.

BRIT. J. VEN. DIS., LONDON—Cont.

In a series of 62 patients with gonorrhea, 20 were treated with a single injection of 0.2 to 0.6 gm. and 42 with 1 gm. of streptomycin. From the results, the author concluded that a single dose of 0.5 gm. of streptomycin probably represents the best treatment for uncomplicated gonococcic infection in patients in whom, pending its exclusion, the risk of syphilis is above average.

Aortitis in bejel. A preliminary report. F. Akrawi and G. F. Rahim. Brit. J. Ven. Dis., 27: 95–96, June 1951.

Of 40 patients treated for late or late latent bejel at the Department of Venereology of the Teaching Hospital at Baghdad, 3 (7.5 percent) were found to be affected with uncomplicated aortitis. Case histories of the 3 patients are presented.

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BRIT. M. J., LONDON

Use of cortisone in diseases of the eye. F. S. Lavery, L. E. Werner, D. O'Donoghue, Philomena M. Guinan, and J. Macdougald. Brit. M. J., No. 4718: 1285–1289, June 9, 1951.

Cortisone was used in the treatment of a variety of eye conditions, among which were nine cases of interstitial keratitis. These were particularly benefited. Symptoms were relieved within 24 hours in eight patients.

Topical cortisone in treatment of syphilitic ocular disease. Gordon O. Horne. Brit. M. J., No. 4718: 1289–1291, June 9, 1951.

The beneficial effect of the topical cortisone in five patients with syphilitic ocular disease is described. The cortisone was used as a suspension (5 mg. per milliliter of normal saline), one drop every 3 hours. There was almost immediate relief of pain and photophobia, and improvement in vision.

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BULL. ACAD. MED., TORONTO, TORONTO

Aneurysm of abdominal aorta. C. D. Farquharson. Bull. Acad. Med., Toronto, 24: 176–178, Aug. 1951.

Etiology, signs and symptoms, diagnosis, prognosis, and treatment of aneurysms of the abdominal aorta are considered. The two causes are arteriosclerosis and syphilis. A review of the literature states that only 500 cases have been reported; however, 5 cases have been found in the medical wards of the Toronto East General Hospital in the last 3½ years, all proved by autopsy. It would appear that this, like many other vascular lesions, will be found much more commonly in a population that is growing older.

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CANAD. J. PUB. HEALTH, TORONTO

Quantitative serologic tests for the diagnosis of syphilis and control of treatment. Jules Archambault. Canad. J. Pub. Health, 42: 323–328, Aug. 1951.

In this paper, presented before the Venereal Disease Control Section at the thirty-ninth annual meeting of the Canadian Public Health Association, May 28–31, 1951, the author discussed quantitative and qualitative technics, methods of reporting, variations in reagin titer, the serologic curve as a guide for treatment and as an aid in the diagnosis of syphilis, therapeutic failures, and seroresistance.

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CANAD. M. A. J., MONTREAL

Homosexuality as a source of venereal disease. B. Kanee and C. L. Hunt. Canad. M. A. J., 65: 138–140, Aug. 1951.

A discussion is presented of the increasingly prevailing practice of homosexuality which presents new problems and is assuming an alarming importance in the dissemination of venereal disease. Of a total of 64 cases of early syphilis reported in British Columbia in 1950, 11 (17 percent) were contracted as a result of homosexual practices. These 11 cases were all investigated in the main Vancouver Clinic, which was responsible for reporting only 19 cases of early syphilis during the year. Probable causes of homosexual activity are considered.

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CHICAGO M. SOC. BULL., CHICAGO

Reported cases of communicable diseases—downstate Illinois, 1947–1950 (four years'

CHICAGO M. SOC. BULL., CHICAGO—Cont.

totals). Chicago M. Soc. Bull., 54 : 57, Aug. 4, 1951.

Included in the diseases reported for the period 1947–50 were 456 cases of syphilis and 358 cases of gonorrhea in persons under the age of 15. For the same period in persons over the age of 15, there were reported 22,539 cases of syphilis, 22,346 cases of gonorrhea, 104 cases of chancroid, 30 cases of lymphogranuloma, and 19 cases of granuloma inguinale.

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### CHINESE M. J., SHANGHAI

A kala-azar complement fixation test; its diagnostic and prognostic value. Huei-Lon Chung and Nai-Cheng Chang. Chinese M. J., 69 : 3–18, Jan.–Feb. 1951.

Results of studies of the serums of 112 proved cases of kala-azar and those of 83 nonkala-azar controls with various diseases, as well as normal subjects, are presented. The serums of 13 patients with syphilis were entirely negative despite the strongly positive blood Wassermann reaction. The antigens used for the kala-azar complement-fixation test were prepared from an infected human spleen as well as from the spleen and liver of hamsters and moles heavily infected with *Leishmania donovani*. Authors felt the test had proved entirely satisfactory and useful in the diagnosis of kala-azar.

A comparative quantitative study of slide Kahn, VDRL, and half-volume Kolmer complement fixation test. Samuel H. Zia, Chiu-Ju Chao, and Yu-Tu Chiang. Chinese M. J., 69 : 19–23, Jan.–Feb. 1951.

A detailed report is presented on comparative quantitative and qualitative studies made on 1,163 specimens. The authors found that while the slide Kahn test compared slightly inferior to the others in sensitivity and specificity, it was of sufficient value to be used as a supplementary method to simple qualitative precipitation in the routine laboratory diagnosis of syphilis.

Differential erythrocyte sedimentation rate in the diagnosis of syphilis: a preliminary report. H. L. Sun and C. K. Hu. Chinese M. J., 69 : 46–51, Jan.–Feb. 1951.

In this study, a total of 241 patients were tested by the Westergren erythrocyte sedimentation method. In syphilis, the erythrocyte sedimentation rate was, in general, accelerated, the degree being more or less in direct proportion to the extent of tissue destruction and activity of the infection. Authors feel it has little value in clinical diagnosis though it may be helpful in prognosis following antisyphilitic treatment. Based upon 231 observations, the modified Bergamasco method seems to have considerable clinical value in the diagnosis of syphilis.

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### CIRCULATION, NEW YORK

Abscesses of the valve rings of the heart, a frequent but not well recognized complication of acute bacterial endocarditis. Walter H. Sheldon and Abner Golden. Circulation, 4 : 1–12, July 1951.

A study is reported of autopsy findings in 12 patients with acute bacterial endocarditis who had received penicillin therapy. Single or multiple abscesses of the valve rings of the heart were encountered in the autopsy findings. The abscesses appeared to originate from mycotic aneurysms of vessels in the valve rings. Increased vascularity of these structures subsequent to syphilitic aortitis, rheumatic heart disease, or atherosclerosis might represent a predisposing factor. In this study, 6 patients had syphilitic aortitis, and 3 showed calcification of the mitral ring.

Angiocardiography. Charles T. Dotter and Israel Steinberg. Circulation, 4 : 123–138, July 1951.

A review of the literature is presented on the development of angiocardiography and its application in congenital and acquired heart disease and in pulmonary disease. It is a useful diagnostic tool in syphilis of the aorta.

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### DELAWARE STATE M. J., FARNHURST

Common virus diseases of the skin. Lawrence Katzenstein. Delaware State M. J., 23 : 175–177, July 1951.

Among the common virus diseases of the skin, the author includes condy-

DELAWARE STATE M. J., FARNHURST—Cont.

lomata acuminata, or venereal warts, and lymphogranuloma venereum. Symptomatology and treatment measures are discussed.

Neuropsychiatric emergencies. Joseph C. Yaskin. Delaware State M. J., 23: 202–207, Aug. 1951.

In this discussion of neurologic and psychiatric emergencies the importance of routine examinations for neurosyphilis is stressed.

Syphilis in Negro patients. C. Lawrence R. Souder. Delaware State M .J., 23: 232–233, Aug. 1951.

A report is presented of 136 patients admitted to Delaware State Hospital between January 1945 and July 1951. It was found that syphilis was either a major or contributing factor of their psychoses. In the majority of these cases the syphilitic involvement of the central nervous system was the direct cause of their psychoses. Treatment measures using penicillin alone or in combination with fever therapy and arsenicals are described.

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GLASGOW M. J., GLASGOW

Severe hypoplastic anaemia in association with tabes dorsalis: report of a case in which recovery from the anaemia followed administration of penicillin. Alexander Brown and L. J. Davis. Glasgow M. J., 32: 184–189, June 1951.

A case report is presented of a 48-year-old woman who developed a severe macrocytic anemia in association with tabes dorsalis. The anemia proved refractory to various forms of hematinic treatment, and during administration of penicillin progressed to almost complete aplasia as revealed by sternal marrow examination. Penicillin was discontinued, and progressive hematologic recovery occurred. This recovery has been maintained during the past 3 years.

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GUY'S HOSP. REP., LONDON

The value of clinical laboratory tests. III. Serum protein levels in disease. W. H. H. Merivale and D. R. C. Willcox. Guy's Hosp. Rep., 100: 45–68, Nos. 1 and 2, 1951.

Results of 318 protein estimations on 222 patients are reported. Of the patients suffering from various chronic infections, only 1 had a low total protein level, while 7, including this patient, had a low albumin, and 5 had high globulin levels. These changes were only observed in patients suffering either from tuberculosis or syphilis.

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HEBREW M. J., NEW YORK

Venereal diseases in Israel. Chaim Berlin. Israel and Health. Hebrew M. J., 1: 180–182, 1951.

Estimated incidence of various types of venereal disease infections in Israel, based on Jewish statistics published during the past 10 years, is presented and discussed.

A positive serology reaction of syphilis in relation to laws of immigration. Julius Citron. Hebrew M. J., 1: 196–200, 1951.

Author presents three case histories of patients with positive serologic reactions, who were denied admission as immigrants to an unspecified country. He feels that this denial was in reality not justified and suggests that cases of this sort should be examined by a medical commission consisting of an internist, a neurologist, and a serologist in order to decide on the medical status of the prospective immigrant.

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INTERNAT. DIGEST OF HEALTH LEGISLATION, (WHO), GENEVA

Poland. Control of venereal disease. Internat. Digest of Health Legislation, (WHO), 2: 616, No. 4, 1951.

Decree No. 338 of 27 July 1949 amended the decree of 16 April 1946 relating to the control of venereal diseases. Persons with venereal disease must provide the physician treating them with information on contacts. Physicians must forward information on all patients treated to the local health authorities.

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J. M. SOC. NEW JERSEY, TRENTON

Treatment of Trichomonas vaginitis. Use of an improved vaginal cream. Joseph T. Cortese and Joseph Padovano. J. M. Soc. New Jersey, 48: 367–369, Aug. 1951.

J. M. Soc. New Jersey, Trenton—Cont.

In this study, a cream containing 2 percent allantoin, 15 percent sulfanilamide, and 0.2 percent 9-aminoacridine hydrochloride in a water miscible base with an acid reaction was used in the treatment of 91 female patients with clinical and bacteriologic evidence of *Trichomonas vaginalis* vaginitis. All of the patients became symptom-free within 7 days. From the literature and these results, the authors concluded that this treatment is the most effective available.

J. Ment. Sc., London

Permeability of the blood-brain barrier to penicillin in cases of parenchymatous neurosyphilis. Robert H. F. Smith. J. Ment. Sc., 97: 340–361, Apr. 1951.

The literature is reviewed, and a study is reported which was made to determine whether penicillin passes into the nervous system in adequate amounts after it is given parenterally. This study included 16 patients (9 male and 7 female) with parenchymatous neurosyphilis who were treated by penicillin administered intramuscularly. From this study it was observed that when small doses of penicillin are given detectable amounts appear in the blood serum, but no penicillin enters the cerebrospinal fluid. When large doses are given large amounts of penicillin can be detected in the blood serum and penicillin then enters the cerebrospinal fluid. From the results of the investigation a scheme of dosage for the treatment of parenchymatous neurosyphilis is suggested.

J. Michigan M. Soc., Lansing

Prematurity. Prevention; management of delivery. George Kamperman and Donald Morgan. J. Michigan M. Soc., 50: 865–871, Aug. 1951.

In this paper, presented at the Fifth Annual Postgraduate Clinical Institute of the Michigan State Medical Society, Detroit, March 14, 1951, the authors discussed the problem of prematurity, its causes, and the care of the premature infant. In a series of 100 unselected cases of prematurity at Harper Hospital during 1949, syphilis accounted for 1 percent of the premature births.

J. Nerv. & Ment. Dis., New York

The precipitation of cerebrospinal fluid proteins by zinc sulphate. Alfred M. Donovan, Joseph M. Foley, and C. Moloney. J. Nerv. & Ment. Dis., 114: 82–84, July 1951.

A preliminary report is presented on observations made by the authors on a test designed to precipitate a globulin fraction from the cerebrospinal fluid. In multiple sclerosis and neurosyphilis, 30 percent of the fluids showed total protein of 40 mg. or over. The test showed a high degree of positivity in multiple sclerosis (19 out of 20 proved cases) and in neurosyphilis with positive cerebrospinal fluid Hinton or Wassermann reactions (20 out of 29).

J. Obst. & Gynaec. Brit. Emp., Timperley

The incidence of *Trichomonas vaginalis* in a sample of the general population: with some observations on its relation to the use of chemical contraceptives. M. Joan Whittington. J. Obst. & Gynaec. Brit. Emp., 58: 398–405, June 1951.

In a group of 562 women attending the birth control section of the Exeter Women's Welfare Clinic, between January 1948 and February 1950, *Trichomonas vaginalis* organisms were found in 30 (5.3 percent) of the patients. The relation between this infection and gynecologic disorders, age, parity, and grade of vaginal flora is discussed. A method for determining trichomonacidal activity of contraceptives in vitro is described.

J. Oral Surg., Chicago

The nasomaxillary epithelial inlay for dish face deformity. John Marquis Converse and Frank E. Jeffreys. J. Oral Surg., 9: 183–187, July 1951.

The authors describe the condition seen in syphilitic persons and known as dish face deformity (marked retrusion of the middle portion of the face), resulting from destruction of bone, cartilage, and nasal lining in the nasomaxillary region. The indications and technic of cavity skin grafting by the epithelial inlay technic in dish face deformities are discussed. A technic for the immediate construction of an appliance, using quick-curing acrylic, is described.

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J. ROY. ARMY M. CORPS, LONDON

The value of anti-histamine drugs in the treatment of infective arthritis and Reiter's disease. Basil Levy. J. Roy. Army M. Corps, 97: 93–96, Aug. 1951.

Case histories of seven patients with infective arthritis treated at the British Military Hospital in Singapore are presented. Two tablets of phenergan, each containing 0.025 gm., were given three times daily until clinical improvement had occurred. No toxic manifestations were noticed. Best results were obtained when a course of at least 7.5 gm. streptomycin was given with the phenergan. Infective arthritis is as closely associated with nonspecific urethritis as it is with gonorrhea.

Syphilitic mental disease in the African Negro. R. R. Willcox. J. Roy. Army M. Corps, 97: 97–110, Aug. 1951.

The author made a survey of 117 mental patients in an African hospital. In this group, 32 to 36 possible cases of neurosyphilis were discovered. Since the group was selected from approximately 650 asylum patients, the actual incidence could be less than one-fifth that amount. That neurosyphilis in the African assumes meningovascular or vascular forms more than paresis and locomotor ataxia is affirmed.

Dermatology in Singapore. Kemble Greenwood. J. Roy. Army M. Corps, 97: 123–128, Aug. 1951.

Among 500 patients treated at the General Hospital Clinic in Singapore were 5 with syphilis and 7 with yaws. The syphilis patients were Chinese, while the yaws patients were non-Chinese. The author stated that he had never seen yaws in a Chinese, although cases have occurred, particularly where Chinese lived on isolated islands on which were found Malay villages.

J. ROY. EGYPTIAN M. A., CAIRO

The diagnosis and treatment of apical thoracopulmonary lesions including the so-called superior pulmonary sulcus tumours. I. Abou Sinna. J. Roy. Egyptian M. A., 34: 34–41, No. 5, 1951.

Case reports are presented for nine male patients with apical thoracopulmonary lesions, including one with apical syphilis of the lung. Clinical and radiologic features of all cases are described. Treatment is discussed, with special reference to radiation therapy.

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M. PRESS, LONDON

The hemolytic anemias. P. Kidd. M. Press, No. 5854: 64–74, July 18, 1951.

The author presents a classification and discussion of the hemolytic anemias. Included in this classification is cold hemoglobinuria, a rare disorder not often seen since the disappearance of syphilis as a major epidemic disease. In the particular form associated with syphilis, often of congenital type, intravascular hemolysis and hemoglobinuria occur in episodes following chilling of the patient.

The management of sore throat. J. H. F. Pankhurst. M. Press, No. 5857: 145–148, Aug. 8, 1951.

The various causes and modern treatment of sore throat are considered. Among the diseases producing throat lesions is syphilis in all its stages. Where any suspicion exists darkground and serologic tests may be required.

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M. WORLD, LONDON

Antibiotics in the treatment of tropical disease. I. Sir Philip Manson-Bahr. M. World, 74: 458–460, June 22, 1951.

A résumé of the literature on the treatment of yaws with penicillin from 1944 through 1950 is presented.

Chancroid in Africa. R. R. Willcox. M. World, 74: 738–741, 752, Aug. 31, 1951.

Diagnosis and treatment of chancroid are discussed. In personal observations in two African capitals, Accra in the Gold Coast and Salisbury in Southern Rhodesia, the author found that chancroid accounted for 18 and 26 percent, respectively, of all African venereal disease infections encountered.

### NEW ENGLAND J. MED., BOSTON

Masking or unveiling syphilis. Editorial. New England J. Med., 244: 955–956, June 21, 1951.

Overemphasis placed on masking of a concomitant infection through treatment of gonorrhea with penicillin is deplored, since some laboratory workers suggest that early treatment of gonorrhea, particularly with a repository type of penicillin, may actually abort or cure concomitantly acquired syphilis during the earlier phase of incubation when the number of treponemes in the body may be very small. However, it is advocated that careful study be given every patient treated for gonorrhea with a special alertness to occurrence of fever, chills, and headache during the first few hours following penicillin injection, since these symptoms may indicate unrecognized syphilis.

### NEW YORK MED., NEW YORK

Present day treatment of syphilis with PAM. Charles R. Rein. New York Med., 7: 16–18, 21–26, July 20, 1951.

After 8 years' experience in treating syphilis of all types with penicillin, it is believed that the most satisfactory type of penicillin is that employing a slow-absorption vehicle containing crystalline procaine penicillin G in 2 percent aluminum monostearate. Schedules are given for all types of syphilis. Penicillin alone surpasses any previously used antisyphilitic remedy when appraised from the therapeutic, economic, technical, toxicity rate, or prophylactic aspects.

### NEW YORK STATE J. MED., NEW YORK

The new Lange colloidal gold test in psychiatry. Nobe E. Stein, Lopo DeMello, and Bernhard Dattner. New York State J. Med., 51: 617–618, Mar. 1, 1951.

The standardized quantitative colloidal gold test of Lange is described. Results of tests on 466 spinal fluids of patients with all types of psychiatric disorders, including 55 with neurosyphilis, at the Manhattan State Hospital, are presented. The syphilitic patients had all types of spinal fluid syndromes commonly seen in this diagnostic group, and 30 nonsyphilitic patients showed minor forms of the so-called D- or parenchymatous type of the Lange reaction, varying from "weak" to "minimal" changes, and no other spinal fluid abnormalities.

### NEW ZEALAND M. J., WELLINGTON

The differential diagnosis of headache. I. M. Allen. New Zealand M. J., 50: 263–276, June 1951.

In this paper, the meaning or nature of headache, the clinical investigation of the patient, the manner in which the headache is produced, conditions actually found in patients who presented themselves with a complaint of headache, and the relative frequency and importance of conditions responsible for the headache are discussed. Cerebrospinal syphilis was found to be the cause of headaches in 10 of 1,000 patients observed.

### NORTHWEST MED., SEATTLE

Infantile cortical hyperostosis with involvement of ilium. Clay A. Racely, Joseph B. Bilderback, and William Y. Burton. Northwest Med., 50: 418–424, June 1951.

Case histories of four patients with infantile cortical hyperostosis are presented. One of these, an 8-week-old white female, is presented because initially the roentgenographic bone appearance was considered compatible with congenital syphilitic periostitis. However, repeated serologic tests on both the parents and infant were negative.

### OHIO STATE M. J., COLUMBUS

The present status of penicillin in the management of syphilis. Roy L. Kile. Ohio State M. J., 47: 522, June 1951.

Author stresses the fact that arsenicals have no place and heavy metals rarely have a place in the modern management of syphilis. Schedule of treatment recommended by the American Academy of Dermatology and Syphilology is given. This includes 1.2 to 2.4 million units of procaine penicillin in a delayed-absorbing type of menstruum, given on the day diagnosis is made and followed by four subsequent injections of 600,000 units each, given at 2- to 3-day intervals.

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PENNSYLVANIA M. J., HARRISBURG

Increasing dependability of multiphasic screening tests. Editorials. Pennsylvania M. J., 54 : 659–660, July 1951.

History of multiphasic screening tests, beginning with mass photofluorography in Germany, and serologic screening for syphilis, is briefly reviewed.

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PROC. ROY. SOC. MED., LONDON

Fibrous stricture of the rectum due to lymphogranuloma venereum. Philip Hawe. Proc. Roy. Soc. Med., 44 : 426–432, June 1951.

The literature is reviewed, and case reports are presented for two patients (one male and one female) with fibrous stricture of the rectum due to lymphogranuloma venereum. In both cases exposure to venereal disease or to irregular intercourse was denied. The male patient was probably infected in India, while the female patient acquired her infection in England. The author discusses progress achieved in the past 15 years by improvements in diagnostic methods, recognition of the earlier stages of the disease and of the general constitutional effects, and advances in surgical treatment.

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PROC. SOC. EXPER. BIOL. & MED., UTICA

Primary isolation of *Donovania granulomatis* by chick brain inoculation, and induction of cerebral miliary granulomata. John B. Thomison. Proc. Soc. Exper. Biol. & Med., 77 : 557–558, July 1951.

This series of experiments was undertaken on the presumption that following direct inoculation of contaminated material containing Donovan bodies into the brains of newly hatched chicks contaminants would not survive, but that *Donovania granulomatis* might persist. The results showed that *D. granulomatis* persisted for at least 9 months in the chick brain, while contaminating material rapidly died out. Intracerebral inoculation of material containing *D. granulomatis* induced miliary granulomata in the brains of the chicks.

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PUB. HEALTH NURSING, NEW YORK

Recommended adjustments for public health nursing services in the national security program. Pub. Health Nursing, 43 : 259–270, May 1951.

Because of the increasing demand for nurses and the urgent need to reach a maximum number of persons if there is full mobilization, it is recommended that communities establish priorities for the most essential public health nursing services and cut to a minimum or discontinue those that are least essential. Among the services to be considered are those pertaining to control of communicable diseases, including syphilis, and the care of children born to syphilitic mothers.

Public health nursing test. The APHA Merit System Service offers a new test. Dorothy Deming. Pub. Health Nursing, 43 : 271–272, May 1951.

This is a report of experience with a student test prepared by the Merit System of the American Public Health Association in 1950 and given to approximately 500 students enrolled in approved graduate nurse programs in public health nursing and in collegiate basic schools. The test consisted of 180 objective-type questions on various subjects, including venereal disease. Conclusions as to its usefulness are drawn.

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QUART. BULL., NEW YORK

For improved obstetrical care. Quart. Bull., 18 : 21–22, Summer 1951.

The Advisory Obstetric Committee to the Department of Health, City of New York, recommends that serologic tests for syphilis be repeated in the third trimester of pregnancy to aid syphilis case finding and decrease the incidence of congenital syphilis.

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SOUTH AFRICAN M. J., CAPE TOWN

Endemic syphilis in Africa: The njovera of Southern Rhodesia. R. R. Willcox. South African M. J., 25 : 501–504, July 21, 1951.

After a review of the literature on the relationship of yaws and syphilis, author discusses incidence of njovera in Southern Rhodesia. The name is used by the Karanga peoples of the N'danga and adjoining regions south and southeast of Fort Victoria to imply a treponematosis. Observations on the incidence, symptoms, and treatment of the disease are presented.

The newer antibiotics with special reference to Chloromycetin. J. Stanley White. South African M. J., 25: 526–529, July 28, 1951.

A brief review of the literature on the use of Chloromycetin in treatment of various diseases, including gonorrhea and yaws, is presented.

Granuloma inguinale with extensive oral involvement. Peter Brain. South African M. J., 25: 581–582, Aug. 18, 1951.

A case of chronic granuloma inguinale in a Bantu male is reported. Secondary extragenital ulcers of the scapular region, face, interior of the mouth and epiglottis occurred 2 to 4 years after the primary genital lesion. Those of the mouth and face were probably due to autoinoculation. All lesions healed following a course of dihydrostreptomycin.

## STATIST. BULL. METROP. LIFE INSUR. CO., NEW YORK

Factors in the decrease in infant mortality. Statist. Bull. Metrop. Life Insur. Co., 32: 7–9, Aug. 1951.

Infant mortality rates from various causes in the years 1933–34 and 1948 are compared. The death rate in infancy from syphilis has dropped 88 percent in this 15-year period.

## TEXAS STATE J. MED., FORT WORTH

Choice of antimicrobial agents in therapy of infections. David Schrum and Ellard M. Yow. Texas State J. Med., 47: 462–468, July 1951.

Tables showing the probable agents of choice in the therapy of specific infections, including gonorrhea, granuloma inguinale, and syphilis, are presented. Routes of administration, dosage, and undesirable reactions are discussed. Penicillin is given as the drug of choice in gonococcic and spirochetal infections. Aureomycin, terramycin, and chloramphenicol are effective in lymphogranuloma venereum and granuloma inguinale.

## UNIV. MICHIGAN M. BULL., ANN ARBOR

Present status of universal reaction in health and disease. Reuben L. Kahn. Univ. Michigan M. Bull., 17: 217–239, July 1951.

The author considers the behavior of the universal reaction in health, in various diseases (including syphilis and yaws), in irradiation of normal animals and of patients, and following the injection of antigenic and nonantigenic substances in animals. The data summarized in this report substantiate previously published findings and indicate that lipid-antigen-antibody reactivity constitutes a field in immunity which has much to contribute to the study of health and disease. Some practical aspects of the reaction are discussed with the aid of illustrative experimental data.

ALLEGHENY COLLEGE LIB

# STATISTICS

## Cases of Syphilis and Gonorrhea Reported to the Public Health Service by State and Territorial Health Departments, Fiscal Years 1941–51

[Known military cases excluded]

| Federal Security Agency regions | 1941 | 1942 | 1943 | 1944 | 1945 | 1946 | 1947 | 1948 | 1949 | 1950 | 1951 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTAL SYPHILIS* | | | | | | | | | | | |
| Region 1—Total | 9,001 | 10,633 | 11,057 | 10,391 | 8,560 | 9,661 | 8,586 | 6,249 | 5,123 | 3,909 | 3,526 |
| Connecticut | 2,027 | 2,596 | 2,893 | 2,933 | 2,341 | 2,313 | 2,163 | 1,336 | 1,055 | 863 | 838 |
| Maine | 718 | 949 | 1,044 | 1,030 | 772 | 809 | 901 | 818 | 590 | 463 | 321 |
| Massachusetts | 4,650 | 5,086 | 5,403 | 4,788 | 4,022 | 4,791 | 3,789 | 2,615 | 2,122 | 1,477 | 1,360 |
| New Hampshire | 308 | 377 | 320 | 296 | 348 | 291 | 360 | 287 | 223 | 152 | 184 |
| Rhode Island | 1,124 | 1,398 | 1,121 | 1,078 | 903 | 1,277 | 1,096 | 855 | 870 | 681 | 648 |
| Vermont | 174 | 227 | 276 | 266 | 174 | 180 | 277 | 338 | 263 | 273 | 175 |
| Region 2—Total | 70,188 | 58,441 | 63,766 | 60,815 | 52,091 | 55,752 | 61,609 | 55,578 | 48,446 | 40,856 | 39,078 |
| Delaware | 1,543 | 935 | 1,059 | 972 | 1,071 | 1,063 | 1,003 | 1,127 | 899 | 676 | 598 |
| New Jersey | 10,568 | 12,759 | 11,066 | 10,868 | 8,081 | 9,554 | 9,670 | 8,250 | 8,607 | 6,364 | 5,173 |
| New York | 42,855 | 41,830 | 39,794 | 35,553 | 31,836 | 33,194 | 33,524 | 32,823 | 27,171 | 24,494 | 26,173 |
| Pennsylvania | [a] 15,222 | 2,917 | 11,847 | 13,422 | 11,103 | 11,941 | 17,412 | 13,378 | 11,769 | [d] 9,322 | [d] 7,134 |
| Region 3—Total | 66,667 | 74,871 | 77,450 | 65,212 | 45,584 | 44,258 | 48,583 | 41,174 | 35,913 | 30,010 | 28,031 |
| District of Columbia | 8,387 | 10,040 | 7,747 | 8,261 | 3,938 | 3,220 | 4,245 | 3,916 | 3,606 | 3,036 | 3,279 |
| Maryland | 10,887 | 11,080 | 19,359 | 13,149 | 10,144 | 8,716 | 7,670 | 6,939 | 7,247 | 4,986 | 3,850 |
| North Carolina | 20,167 | 15,449 | 17,243 | 11,118 | 8,524 | 8,203 | 9,034 | 7,883 | 6,992 | 5,741 | 4,595 |
| Virginia | 18,438 | 18,708 | 17,792 | 15,701 | 10,048 | 10,080 | 11,153 | 9,865 | 6,364 | 4,725 | 5,211 |
| West Virginia | 7,700 | 8,504 | 5,395 | 3,556 | 2,680 | 5,551 | 8,593 | 5,793 | 4,899 | 3,534 | 2,615 |
| Puerto Rico | [c] 1,088 | 10,474 | 9,694 | 13,345 | 10,003 | 8,414 | 7,759 | 6,604 | 6,646 | 7,890 | 8,357 |
| Virgin Islands | ------ | 616 | 220 | 182 | 247 | 74 | 129 | 174 | 159 | 98 | [d] 124 |
| Region 4—Total | 34,452 | 39,278 | 50,296 | 47,433 | 41,688 | 41,928 | 40,729 | 38,577 | 34,280 | 26,495 | 24,183 |
| Kentucky | 6,930 | 9,144 | 12,710 | 6,673 | 5,047 | 5,878 | 6,527 | 6,104 | 4,580 | 3,418 | 2,908 |
| Michigan | 9,823 | 11,631 | 14,086 | 17,484 | 16,889 | 16,364 | 17,226 | 13,891 | 10,094 | 8,363 | 8,494 |
| Ohio | 17,699 | 18,503 | 23,500 | 23,276 | 19,752 | 19,686 | 16,976 | 18,582 | 19,606 | 14,714 | 12,781 |
| Region 5—Total | 32,659 | 38,218 | 46,454 | 39,422 | 31,698 | 31,406 | 32,396 | 26,650 | 23,709 | 19,527 | 16,846 |
| Illinois | 22,131 | 25,692 | 29,630 | 27,719 | 22,277 | 21,606 | 21,320 | 18,167 | 15,337 | 12,396 | 10,516 |
| Indiana | 6,766 | 8,744 | 12,770 | 8,378 | 6,339 | 5,733 | 7,057 | 5,291 | 5,253 | 3,996 | 3,770 |
| Minnesota | 2,546 | 2,828 | 2,955 | 2,419 | 1,705 | 1,444 | 1,636 | 1,125 | 1,001 | 1,063 | 586 |
| Wisconsin | 1,216 | 954 | 1,099 | 906 | 1,377 | 2,623 | 2,383 | 2,067 | 2,118 | 2,072 | 1,974 |
| Region 6—Total | 151,181 | 142,167 | 163,768 | 119,141 | 82,073 | 85,786 | 86,985 | 75,813 | 63,953 | 52,787 | 42,790 |
| Alabama | 21,616 | 16,258 | 21,114 | 17,653 | 13,045 | 12,796 | 19,257 | 22,432 | 13,038 | 9,599 | 5,979 |
| Florida | 20,216 | 23,959 | 35,055 | 26,978 | 15,538 | 15,868 | 17,963 | 14,418 | 14,392 | 11,178 | 10,494 |
| Georgia | 20,960 | 20,976 | 27,638 | 15,286 | 10,961 | 14,337 | 11,974 | 12,152 | 11,099 | 8,903 | 7,612 |
| Mississippi | 50,224 | 40,690 | 38,002 | 25,867 | 21,488 | 23,414 | 17,946 | 9,997 | 12,855 | 11,445 | 8,531 |
| South Carolina | 18,562 | 18,921 | 18,146 | 14,627 | 7,803 | 6,763 | 8,028 | 7,511 | 6,278 | 6,150 | 4,754 |
| Tennessee | 19,603 | 21,363 | 23,813 | 18,730 | 13,238 | 12,608 | 11,817 | 9,303 | 6,291 | 5,512 | 5,420 |
| Region 7—Total | 16,838 | 21,313 | 18,351 | 17,725 | 15,227 | 16,894 | 17,492 | 14,534 | 13,418 | 12,331 | 10,765 |
| Iowa | 2,603 | 2,442 | 2,842 | 2,366 | 1,483 | 1,526 | 1,717 | 2,222 | 1,807 | 2,095 | 1,853 |
| Kansas | 2,907 | 3,504 | 3,887 | 2,780 | 2,491 | 1,893 | 2,656 | 2,335 | 3,171 | 2,638 | 2,168 |
| Missouri | 9,391 | 12,687 | 8,842 | 10,427 | 9,355 | 11,039 | 10,036 | 7,684 | 6,552 | 5,896 | 5,456 |
| Nebraska | 958 | 1,643 | 1,945 | 1,379 | 1,246 | 1,778 | 2,216 | 1,394 | 1,194 | 1,079 | 803 |
| North Dakota | 393 | 318 | 327 | 312 | 211 | 263 | 328 | 402 | 253 | 248 | 252 |
| South Dakota | 586 | 719 | 508 | 461 | 441 | 395 | 539 | 497 | 441 | 375 | 233 |
| Region 8—Total | 62,464 | 65,262 | 94,933 | 61,772 | 47,812 | 47,948 | 50,015 | 57,977 | 47,472 | 35,297 | 27,744 |
| Arkansas | 11,259 | 13,828 | 16,681 | 9,891 | 13,485 | 11,085 | 10,430 | 17,483 | 12,762 | 8,304 | 5,729 |
| Louisiana | [a] 9,899 | 14,297 | 19,084 | 17,580 | 11,509 | 15,709 | 14,593 | 9,897 | 10,405 | 9,835 | 9,192 |
| New Mexico | 1,450 | [a] 1,771 | 2,352 | 2,009 | 1,883 | 1,658 | 1,507 | 1,417 | 1,358 | 1,163 | 965 |
| Oklahoma | 8,501 | 8,242 | 11,030 | 8,098 | 7,081 | 7,159 | 7,699 | 6,160 | 4,614 | 3,311 | 2,708 |
| Texas | 31,355 | 27,124 | 45,786 | 24,194 | 13,854 | 12,337 | 15,786 | 23,020 | 18,333 | 12,684 | 9,150 |
| Region 9—Total | 5,840 | 6,338 | 7,422 | 6,258 | 5,478 | 4,286 | 4,141 | 3,732 | 2,680 | 2,112 | 1,454 |
| Colorado | 3,741 | 4,220 | 5,103 | 3,262 | 2,575 | 2,423 | 2,042 | 1,663 | 1,135 | 972 | 661 |
| Idaho | 354 | 398 | 459 | 664 | 783 | 755 | 787 | 731 | 307 | 308 | 280 |
| Montana | 338 | 416 | 475 | 435 | 467 | 289 | 489 | 682 | 494 | 291 | 187 |
| Utah | 908 | 789 | 714 | 824 | 557 | 504 | 460 | 393 | 497 | 324 | 130 |
| Wyoming | [a] 499 | 515 | 671 | 1,073 | 1,096 | 315 | 363 | 263 | 247 | 217 | 196 |
| Region 10—Total | 30,636 | 27,887 | 42,602 | 44,556 | 37,068 | 32,383 | 31,577 | 25,468 | 21,355 | 16,814 | 13,106 |
| Arizona | 2,018 | 904 | 2,813 | 2,887 | 1,717 | 1,526 | 1,475 | 1,176 | 1,279 | 2,382 | 1,508 |
| California | 22,882 | 21,261 | 32,611 | 33,740 | 28,744 | 25,076 | 25,058 | 19,558 | 16,143 | 11,655 | 9,789 |
| Nevada | 375 | 458 | 767 | 813 | 410 | 504 | 600 | 626 | 688 | 495 | 360 |
| Oregon | [a] 1,433 | 1,093 | 1,410 | 1,967 | 1,810 | 1,504 | 1,536 | 1,434 | 776 | 658 | 387 |

See footnotes at end of table, p. 393.

## Cases of Syphilis and Gonorrhea Reported to the Public Health Service by State and Territorial Health Departments, Fiscal Years 1941–51—Continued

[Known military cases excluded]

| Federal Security Agency regions | 1941 | 1942 | 1943 | 1944 | 1945 | 1946 | 1947 | 1948 | 1949 | 1950 | 1951 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTAL SYPHILIS | | | | | | | | | | | |
| Washington | 2,931 | 3,098 | 3,736 | 4,050 | 3,673 | 2,877 | 1,979 | 1,841 | 1,694 | 1,041 | 660 |
| Alaska | [b] 207 | 204 | 158 | 100 | 131 | 132 | 127 | 212 | 340 | 215 | 104 |
| Hawaii | 790 | 869 | 1,107 | 999 | 583 | 764 | 802 | 621 | 435 | 368 | 298 |
| Canal Zone | ------ | ------ | ------ | ------ | 870 | 600 | 312 | 240 | 235 | 346 | 333 |
| Continental United States | 477,841 | 472,245 | 564,920 | 458,199 | 356,315 | 360,918 | 373,296 | 338,141 | 288,769 | 231,567 | 198,640 |
| United States including Territories | 479,926 | 484,408 | 576,099 | 472,725 | 367,279 | 370,902 | 382,425 | 345,992 | 296,584 | 240,484 | 207,856 |

[a] Includes estimate for 1 month not reported.
[b] Includes estimate for 2 months not reported.
[c] Data for 1 month; reporting began in June.
[d] Estimated.
*Includes "Not stated."

Source: PHS Forms 8958–B and 688–FSA–PHS Division of Venereal Disease, Office of Statistics 10/12/51 (ML–BBM)mws.

## Cases of Syphilis and Gonorrhea Reported to the Public Health Service by State and Territorial Health Departments, Fiscal Years 1941–51—Continued

[Known military cases excluded]

| Federal Security Agency regions | 1941 | 1942 | 1943 | 1944 | 1945 | 1946 | 1947 | 1948 | 1949 | 1950 | 1951 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PRIMARY AND SECONDARY SYPHILIS | | | | | | | | | | | |
| Region 1—Total | 1,145 | 1,621 | 1,632 | 1,790 | 1,538 | 3,007 | 2,644 | 1,598 | 1,088 | 607 | 419 |
| Connecticut | 196 | 291 | 280 | 325 | 272 | 407 | 436 | 235 | 160 | 103 | 76 |
| Maine | 202 | 233 | 226 | 202 | 144 | 410 | 483 | 406 | 264 | 176 | 85 |
| Massachusetts | 571 | 821 | 912 | 998 | 871 | 1,728 | 1,212 | 697 | 449 | 216 | 187 |
| New Hampshire | 21 | 31 | 35 | 45 | 41 | 70 | 100 | 63 | 71 | 22 | 10 |
| Rhode Island | 99 | 106 | 52 | 142 | 190 | 310 | 252 | 104 | 84 | 24 | 14 |
| Vermont | 56 | 139 | 127 | 78 | 20 | 82 | 161 | 93 | 60 | 66 | 47 |
| Region 2—Total | 6,461 | 5,344 | 7,599 | 8,753 | 9,847 | 12,112 | 14,136 | 10,205 | 6,818 | 3,808 | 2,153 |
| Delaware | 121 | 108 | 125 | 162 | 324 | 398 | 364 | 276 | 173 | 137 | 53 |
| New Jersey | 1,143 | 1,315 | 1,314 | 1,317 | 1,181 | 1,654 | 2,019 | 1,362 | 1,001 | 529 | 287 |
| New York | 3,211 | 3,375 | 4,515 | 5,522 | 6,367 | 7,350 | 7,367 | 5,392 | 3,720 | 2,005 | 1,165 |
| Pennsylvania | [a] 1,986 | 546 | 1,645 | 1,752 | 1,975 | 2,710 | 4,386 | 3,175 | 1,924 | [d] 1,137 | [d] 648 |
| Region 3—Total | 10,035 | 13,476 | 14,382 | 12,275 | 11,210 | 13,288 | 16,835 | 12,578 | 8,345 | 5,038 | 2,923 |
| District of Columbia | ------ | ------ | 1,087 | 1,070 | 883 | 921 | 1,579 | 1,228 | 858 | 334 | 82 |
| Maryland | 1,204 | 1,163 | 1,384 | 1,671 | 1,742 | 2,170 | 2,379 | 2,093 | 1,696 | 886 | 385 |
| North Carolina | 3.319 | 3,541 | 3,666 | 3,120 | 3,003 | 3,426 | 4,404 | 3,415 | 2,418 | 1,537 | 891 |
| Virginia | 4,088 | 5,238 | 5,313 | 4,136 | 3,048 | 2,998 | 3,808 | 3,044 | 1,592 | 987 | 741 |
| West Virginia | 1,226 | 962 | 858 | 646 | 1,135 | 2,694 | 3,689 | 2,068 | 1,201 | 677 | 392 |
| Puerto Rico | [c] 198 | 2,399 | 2,020 | 1,605 | 1,342 | 1,070 | 952 | 711 | 556 | 598 | 419 |
| Virgin Islands | ------ | 173 | 54 | 27 | 57 | 9 | 24 | 19 | 24 | 19 | [d] 13 |
| Region 4—Total | 5,096 | 5,890 | 6,878 | 7,375 | 8,816 | 11,675 | 11,587 | 8,623 | 5,190 | 2,529 | 1,476 |
| Kentucky | 1,095 | 1,317 | 1,532 | 1,065 | 1,381 | 2,458 | 2,683 | 2,043 | 1,090 | 555 | 310 |
| Michigan | 1,303 | 1,632 | 1,909 | 2,531 | 3,159 | 3,943 | 3,924 | 2,629 | 1,646 | 808 | 559 |
| Ohio | 2,698 | 2,941 | 3,437 | 3,779 | 4,276 | 5,274 | 4,980 | 3,951 | 2,454 | 1,166 | 607 |
| Region 5—Total | 3,821 | 5,487 | 5,472 | 5,379 | 5,494 | 7,768 | 9,454 | 6,725 | 4,640 | 2,888 | 1,793 |
| Illinois | 2,088 | 3,185 | 3,353 | 3,698 | 3,744 | 5,413 | 6,044 | 4,474 | 3,115 | 2,004 | 1,206 |
| Indiana | 1,286 | 1,866 | 1,674 | 1,261 | 1,214 | 1,307 | 2,117 | 1,688 | 1,103 | 585 | 334 |
| Minnesota | 207 | 243 | 237 | 234 | 263 | 417 | 623 | 262 | 123 | 53 | 50 |
| Wisconsin | 240 | 193 | 208 | 186 | 273 | 631 | 670 | 301 | 299 | 246 | 203 |

See footnotes at end of table, p. 394.

## Cases of Syphilis and Gonorrhea Reported to the Public Health Service by State and Territorial Health Departments, Fiscal Years 1941–51—Continued

[Known military cases excluded]

| Federal Security Agency regions | 1941 | 1942 | 1943 | 1944 | 1945 | 1946 | 1947 | 1948 | 1949 | 1950 | 1951 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PRIMARY AND SECONDARY SYPHILIS | | | | | | | | | | | |
| Region 6—Total | 23, 150 | 29, 080 | 28, 337 | 22, 759 | 18, 864 | 22, 781 | 25, 035 | 20, 236 | 14, 406 | 8, 819 | 4, 941 |
| Alabama | 2, 788 | 2, 298 | 3, 260 | 2, 188 | 2, 150 | 2, 797 | 3, 272 | 3, 288 | 2, 395 | 1, 503 | 604 |
| Florida | 3, 217 | 3, 738 | 4, 192 | 3, 091 | 1, 809 | 2, 920 | 4, 126 | 4, 769 | 3, 260 | 1, 978 | 1, 301 |
| Georgia | 1, 178 | 4, 049 | 3, 965 | 3, 139 | 2, 969 | 2, 799 | 3, 789 | 3, 606 | 3, 020 | 2, 223 | 1, 340 |
| Mississippi | 6, 588 | 10, 549 | 9, 691 | 8, 769 | 7, 208 | 8, 323 | 7, 207 | 3, 065 | 2, 228 | 1, 168 | 682 |
| South Carolina | 6, 270 | 5, 428 | 4, 234 | 3, 203 | 2, 341 | 2, 449 | 2, 608 | 2, 789 | 1, 851 | 1, 009 | 465 |
| Tennessee | 3, 109 | 3, 018 | 2, 995 | 2, 369 | 2, 387 | 3, 493 | 4, 033 | 2, 719 | 1, 652 | 938 | 549 |
| Region 7—Total | 3, 226 | 3, 135 | 2, 900 | 3, 231 | 3, 296 | 4, 720 | 5, 365 | 3, 749 | 2, 633 | 1, 714 | 1, 180 |
| Iowa | 434 | 350 | 386 | 468 | 338 | 522 | 650 | 547 | 416 | 291 | 259 |
| Kansas | 603 | 537 | 682 | 534 | 548 | 541 | 762 | 579 | 494 | 308 | 211 |
| Missouri | 1, 702 | 1, 827 | 1, 460 | 1, 844 | 2, 095 | 3, 010 | 3, 131 | 1, 991 | 1, 310 | 868 | 577 |
| Nebraska | 241 | 236 | 225 | 209 | 198 | 409 | 465 | 271 | 181 | 95 | 62 |
| North Dakota | 91 | 45 | 42 | 96 | 41 | 102 | 159 | 189 | 90 | 58 | 27 |
| South Dakota | 155 | 140 | 105 | 80 | 76 | 136 | 198 | 172 | 142 | 94 | 44 |
| Region 8—Total | 9, 475 | 8, 499 | 9, 511 | 9, 167 | 11, 247 | 12, 039 | 13, 094 | 10, 594 | 7, 188 | 4, 907 | 2, 480 |
| Arkansas | 1, 836 | 1, 604 | 1, 758 | 1, 236 | 3, 745 | 2, 698 | 2, 821 | 2, 386 | 1, 244 | 832 | 420 |
| Louisiana | 2, 023 | [a] 1, 645 | 2, 608 | 3, 123 | 2, 589 | 4, 123 | 4, 680 | 2, 845 | 1, 750 | 1, 017 | 709 |
| New Mexico | 330 | 381 | 411 | 414 | 383 | 394 | 537 | 371 | 228 | 233 | 100 |
| Oklahoma | 1, 162 | 1, 278 | 1, 594 | 1, 110 | 1, 160 | 1, 284 | 1, 626 | 1, 198 | 884 | 493 | 252 |
| Texas | 4, 124 | 3, 591 | 3, 140 | 3, 284 | 3, 370 | 3, 540 | 3, 430 | 3, 794 | 3, 082 | 2, 332 | 999 |
| Region 9—Total | 1, 474 | 1, 382 | 1, 676 | 1, 372 | 1, 232 | 1, 339 | 1, 401 | 1, 124 | 592 | 363 | 198 |
| Colorado | 990 | 820 | 969 | 709 | 677 | 841 | 723 | 500 | 288 | 189 | 106 |
| Idaho | 123 | 131 | 166 | 229 | 147 | 184 | 230 | 180 | 57 | 22 | 19 |
| Montana | 80 | 103 | 157 | 108 | 90 | 87 | 177 | 253 | 111 | 56 | 36 |
| Utah | 139 | 153 | 220 | 202 | 153 | 158 | 128 | 109 | 87 | 53 | 22 |
| Wyoming | [a] 142 | 175 | 164 | 124 | 165 | 69 | 143 | 82 | 49 | 43 | 15 |
| Region 10—Total | 4, 436 | 4, 642 | 6, 242 | 8, 215 | 7, 007 | 7, 404 | 8, 163 | 5, 964 | 4, 013 | 2, 230 | 1, 105 |
| Arizona | 309 | 195 | 431 | 730 | 481 | 530 | 638 | 447 | 384 | 396 | 190 |
| California | 3, 085 | 3, 419 | 4, 438 | 5, 731 | 5, 048 | 5, 584 | 6, 070 | 4, 362 | 2, 894 | 1, 480 | 751 |
| Nevada | 24 | 6 | 1 | 83 | 93 | 111 | 176 | 181 | 103 | 52 | 24 |
| Oregon | [a] 334 | 240 | 277 | 590 | 475 | 392 | 511 | 354 | 215 | 91 | 47 |
| Washington | 521 | 502 | 770 | 815 | 765 | 690 | 624 | 482 | 352 | 175 | 68 |
| Alaska | [b] 67 | 46 | 48 | 54 | 36 | 48 | 65 | 50 | 46 | 24 | 19 |
| Hawaii | 96 | 234 | 277 | 212 | 109 | 49 | 79 | 88 | 19 | 12 | 6 |
| Canal Zone | -------- | -------- | -------- | -------- | 98 | 89 | 58 | 32 | 26 | 37 | 34 |
| Continental United States | 67, 958 | 75, 704 | 82, 230 | 78, 418 | 77, 007 | 94, 957 | 106, 594 | 80, 528 | 54, 268 | 32, 250 | 18, 211 |
| United States, including Territories | 68, 319 | 78, 556 | 84, 629 | 80, 316 | 78, 649 | 96, 222 | 107, 772 | 81, 428 | 54, 939 | 32, 940 | 18, 702 |

[a] Includes estimate for 1 month not reported.
[b] Includes estimate for 2 months not reported.
[c] Data for 1 month; reporting began in June.
[d] Estimated.

Source: PHS Forms 8958-B and 688-FSA-PHS Division of Venereal Disease, Office of Statistics (ML—BBM) mws.

## Cases of Syphilis and Gonorrhea Reported to the Public Health Service by State and Territorial Health Departments, Fiscal Years 1941–51—Continued

[Known military cases excluded]

| Federal Security Agency regions | 1941 | 1942 | 1943 | 1944 | 1945 | 1946 | 1947 | 1948 | 1949 | 1950 | 1951 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| EARLY LATENT SYPHILIS | | | | | | | | | | | |
| Region 1—Total | 384 | 895 | 310 | 394 | 303 | 264 | 1, 203 | 981 | 798 | 704 | 669 |
| Connecticut | 133 | 580 | ------ | ------ | ------ | ------ | 489 | 327 | 244 | 259 | 315 |
| Maine | 46 | 107 | 175 | 141 | 123 | 102 | 108 | 114 | 97 | 83 | 52 |
| Massachusetts | ------ | ------ | ------ | ------ | ------ | ------ | 392 | 383 | 297 | 255 | 205 |
| New Hampshire | 17 | 37 | 28 | 56 | 45 | 33 | 56 | 41 | 30 | 15 | 12 |
| Rhode Island | 138 | 171 | 92 | 113 | 88 | 111 | 129 | 98 | 119 | 80 | 61 |
| Vermont | 50 | 0 | 15 | 84 | 47 | 18 | 29 | 18 | 11 | 12 | 24 |
| Region 2—Total | 13, 400 | 11, 821 | 13, 904 | 14, 755 | 13, 338 | 16, 101 | 17, 087 | 15, 561 | 13, 283 | 9, 970 | 8, 196 |
| Delaware | 235 | 281 | 250 | 286 | 342 | 352 | 345 | 337 | 335 | 220 | 196 |
| New Jersey | 2, 161 | 2, 943 | 2, 955 | 3, 220 | 2, 226 | 3, 186 | 3, 426 | 2, 963 | 2, 862 | 2, 009 | 1, 551 |
| New York | 5, 396 | 6, 358 | 5, 492 | 6, 464 | 6, 811 | 8, 295 | 7, 384 | 7, 098 | 5, 452 | 4, 352 | 3, 964 |
| Pennsylvania | [a] 5, 608 | 2, 239 | 5, 207 | 4, 785 | 3, 959 | 4, 268 | 5, 932 | 5, 163 | 4, 634 | [d] 3, 389 | [d] 2, 485 |
| Region 3—Total | 14, 837 | 16, 241 | 20, 128 | 17, 942 | 14, 868 | 14, 710 | 16, 117 | 14, 830 | 13, 427 | 10, 913 | 9, 696 |
| District of Columbia | ------ | ------ | 2, 250 | 1, 968 | 1, 201 | 1, 229 | 1, 508 | 1, 260 | 1, 119 | 950 | 917 |
| Maryland | 420 | 845 | 1, 552 | 2, 059 | 2, 341 | 2, 044 | 1, 634 | 1, 932 | 1, 985 | 1, 191 | 991 |
| North Carolina | 8, 457 | 6, 233 | 7, 305 | 4, 411 | 3, 288 | 3, 046 | 3, 116 | 3, 045 | 2, 961 | 2, 644 | 2, 210 |
| Virginia | 4, 795 | 6, 145 | 6, 480 | 6, 078 | 3, 972 | 4, 000 | 4, 074 | 3, 643 | 2, 567 | 1, 761 | 1, 769 |
| West Virginia | 1, 001 | 1, 274 | 924 | 555 | 552 | 1, 333 | 2, 275 | 1, 540 | 1, 364 | 968 | 632 |
| Puerto Rico | [c] 164 | 1, 457 | 1, 496 | 2, 764 | 3, 371 | 3, 017 | 3, 426 | 3, 313 | 3, 380 | 3, 363 | 3, 108 |
| Virgin Islands | ------ | 287 | 121 | 107 | 143 | 41 | 84 | 97 | 51 | 36 | [d] 69 |
| Region 4—Total | 5, 972 | 7, 438 | 11, 446 | 11, 910 | 11, 443 | 11, 347 | 10, 777 | 11, 199 | 9, 743 | 7, 264 | 6, 154 |
| Kentucky | 897 | 1, 842 | 2, 787 | 1, 454 | 1, 212 | 1, 518 | 1, 660 | 1, 542 | 1, 263 | 917 | 656 |
| Michigan | 1, 497 | 1, 672 | 3, 124 | 4, 718 | 4, 882 | 4, 194 | 3, 993 | 3, 344 | 2, 108 | 1, 896 | 1, 899 |
| Ohio | 3, 578 | 3, 924 | 5, 535 | 5, 738 | 5, 349 | 5, 635 | 5, 124 | 6, 313 | 6, 372 | 4, 451 | 3, 599 |
| Region 5—Total | 5, 124 | 6, 508 | 7, 005 | 7, 251 | 6, 350 | 7, 329 | 8, 442 | 7, 380 | 6, 548 | 5, 031 | 4, 147 |
| Illinois | 4, 283 | 5, 453 | 6, 214 | 6, 109 | 5, 295 | 6, 041 | 6, 398 | 5, 429 | 4, 516 | 3, 519 | 2, 804 |
| Indiana | 539 | 750 | 465 | 860 | 855 | 712 | 1, 280 | 1, 229 | 1, 436 | 1, 087 | 982 |
| Minnesota | 234 | 279 | 325 | 282 | 197 | 231 | 244 | 191 | 157 | 105 | 85 |
| Wisconsin | 68 | 26 | 1 | 0 | 3 | 345 | 520 | 531 | 439 | 320 | 276 |
| Region 6—Total | 45, 052 | 46, 861 | 56, 482 | 39, 340 | 28, 808 | 29, 942 | 28, 571 | 25, 258 | 21, 999 | 17, 512 | 13, 037 |
| Alabama | 6, 046 | 4, 550 | 5, 836 | 4, 027 | 3, 903 | 4, 321 | 5, 075 | 6, 049 | 4, 669 | 3, 452 | 1, 872 |
| Florida | 3, 403 | 5, 611 | 9, 105 | 8, 734 | 5, 926 | 6, 966 | 6, 287 | 5, 095 | 5, 302 | 4, 213 | 3, 739 |
| Georgia | 13, 063 | 10, 234 | 12, 984 | 6, 032 | 4, 309 | 4, 082 | 3, 838 | 4, 019 | 3, 475 | 2, 305 | 2, 008 |
| Mississippi | 11, 926 | 13, 859 | 12, 715 | 7, 380 | 6, 830 | 7, 626 | 5, 424 | 3, 593 | 3, 423 | 2, 743 | 1, 631 |
| South Carolina | 4, 668 | 5, 976 | 7, 571 | 5, 554 | 2, 471 | 2, 188 | 3, 547 | 3, 110 | 2, 824 | 2, 844 | 2, 344 |
| Tennessee | 5, 946 | 6, 631 | 8, 271 | 7, 613 | 5, 369 | 4, 759 | 4, 400 | 3, 392 | 2, 306 | 1, 955 | 1, 443 |
| Region 7—Total | 5, 310 | 5, 225 | 3, 954 | 4, 570 | 4, 105 | 5, 319 | 5, 002 | 4, 242 | 3, 573 | 2, 983 | 2, 593 |
| Iowa | 653 | 682 | 895 | 608 | 428 | 438 | 478 | 656 | 441 | 397 | 377 |
| Kansas | 376 | 422 | 576 | 600 | 481 | 456 | 637 | 539 | 686 | 569 | 468 |
| Missouri | 3, 907 | 3, 415 | 1, 722 | 2, 660 | 2, 700 | 3, 844 | 3, 154 | 2, 435 | 1, 952 | 1, 576 | 1, 425 |
| Nebraska | 185 | 421 | 538 | 557 | 343 | 455 | 523 | 365 | 275 | 243 | 160 |
| North Dakota | 62 | 66 | 61 | 55 | 37 | 48 | 51 | 70 | 54 | 61 | 82 |
| South Dakota | 127 | 219 | 162 | 90 | 116 | 78 | 159 | 177 | 165 | 137 | 81 |
| Region 8—Total | 12, 553 | 16, 775 | 26, 789 | 18, 065 | 15, 833 | 16, 115 | 15, 011 | 14, 922 | 12, 893 | 10, 587 | 8, 039 |
| Arkansas | 3, 073 | 4, 128 | 6, 440 | 3, 318 | 4, 600 | 4, 052 | 4, 062 | 4, 246 | 3, 229 | 2, 248 | 1, 701 |
| Louisiana | 11 | [a] 3, 237 | 5, 727 | 4, 599 | 3, 285 | 4, 295 | 3, 599 | 2, 903 | 2, 971 | 2, 604 | 2, 372 |
| New Mexico | 191 | 390 | 556 | 478 | 527 | 477 | 445 | 440 | 515 | 436 | 385 |
| Oklahoma | 1, 824 | 2, 093 | 4, 051 | 2, 180 | 1, 962 | 2, 059 | 1, 928 | 1, 764 | 1, 210 | 784 | 587 |
| Texas | 7, 454 | 6, 927 | 10, 015 | 7, 490 | 5, 459 | 5, 232 | 4, 977 | 5, 569 | 4, 968 | 4, 515 | 2, 994 |
| Region 9—Total | 341 | 828 | 1, 492 | 1, 393 | 1, 359 | 1, 103 | 999 | 916 | 652 | 501 | 335 |
| Colorado | 211 | 683 | 1, 285 | 904 | 699 | 672 | 520 | 430 | 285 | 219 | 150 |
| Idaho | 0 | 0 | 36 | 132 | 189 | 202 | 206 | 139 | 58 | 56 | 65 |
| Montana | 1 | 5 | 34 | 63 | 41 | 58 | 97 | 162 | 138 | 114 | 54 |
| Utah | 81 | 92 | 90 | 115 | 77 | 94 | 95 | 93 | 90 | 54 | 18 |
| Wyoming | [a] 48 | 48 | 47 | 179 | 353 | 77 | 81 | 92 | 81 | 58 | 48 |
| Region 10—Total | 5, 891 | 5, 708 | 9, 193 | 9, 759 | 8, 334 | 8, 263 | 8, 207 | 6, 043 | 5, 017 | 3, 636 | 2, 704 |
| Arizona | 222 | 157 | 659 | 818 | 506 | 467 | 382 | 319 | 451 | 1, 043 | 540 |
| California | 4, 846 | 4, 630 | 7, 446 | 7, 700 | 6, 603 | 6, 658 | 6, 976 | 4, 840 | 3, 737 | 2, 086 | 1, 839 |
| Nevada | 85 | 75 | 171 | 101 | 12 | 3 | 3 | 2 | 80 | 38 | 37 |
| Oregon | [a] 268 | 220 | 118 | 143 | 224 | 194 | 234 | 218 | 187 | 136 | 90 |

See footnotes at end of table, p. 396.

## Cases of Syphilis and Gonorrhea Reported to the Public Health Service by State and Territorial Health Departments, Fiscal Years 1941–51—Continued

[Known military cases excluded]

| Federal Security Agency regions | 1941 | 1942 | 1943 | 1944 | 1945 | 1946 | 1947 | 1948 | 1949 | 1950 | 1951 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| EARLY LATENT SYPHILIS | | | | | | | | | | | |
| Washington | 428 | 503 | 622 | 879 | 897 | 842 | 461 | 487 | 402 | 198 | 114 |
| Alaska | [b] 6 | 64 | 41 | 16 | 26 | 27 | 39 | 73 | 92 | 91 | 39 |
| Hawaii | 36 | 59 | 136 | 102 | 66 | 72 | 112 | 104 | 68 | 44 | 45 |
| Canal Zone | ------- | ------- | ------- | ------- | 189 | 159 | 83 | 67 | 72 | 72 | 62 |
| Continental United States | 108, 658 | 116, 433 | 148, 909 | 122, 390 | 101, 135 | 107, 336 | 107, 755 | 97, 745 | 84, 342 | 65, 567 | 52, 309 |
| United States, including Territories | 108, 864 | 118, 300 | 150. 703 | 125, 379 | 104, 930 | 110, 652 | 111, 499 | 101, 399 | 88, 005 | 69, 173 | 55, 632 |

[a] Includes estimate for 1 month not reported.
[b] Includes estimate for 2 months not reported.
[c] Data for 1 month; reporting began in June.
[d] Estimated.

Source: PHS Forms 8958–B and 688 FSA–PHS Division of Venereal Disease, Office of Statistics, Oct. 10, 1951 (ML–BBM)mws.

## Cases of Syphilis and Gonorrhea Reported to the Public Health Service by State and Territorial Health Departments, Fiscal Years 1941–51—Continued

[Known military cases excluded]

| Federal Security Agency regions | 1941 | 1942 | 1943 | 1944 | 1945 | 1946 | 1947 | 1948 | 1949 | 1950 | 1951 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LATE AND LATE LATENT SYPHILIS | | | | | | | | | | | |
| Region 1—Total | 6, 341 | 6, 761 | 7, 783 | 6, 953 | 5, 628 | 5, 526 | 3, 873 | 2, 823 | 2, 501 | 2, 065 | 2, 061 |
| Connecticut | 1, 206 | 1, 122 | 1, 915 | 2, 022 | 1, 600 | 1, 595 | 924 | 548 | 441 | 352 | 362 |
| Maine | 384 | 466 | 463 | 525 | 333 | 243 | 257 | 248 | 193 | 186 | 160 |
| Massachusetts | 3, 776 | 3, 962 | 4, 215 | 3, 496 | 2, 931 | 2, 855 | 1, 974 | 1, 366 | 1, 249 | 905 | 873 |
| New Hampshire | 172 | 248 | 218 | 158 | 227 | 159 | 162 | 152 | 107 | 94 | 137 |
| Rhode Island | 750 | 893 | 855 | 661 | 468 | 613 | 503 | 452 | 465 | 422 | 443 |
| Vermont | 53 | 70 | 117 | 91 | 69 | 61 | 53 | 57 | 46 | 106 | 86 |
| Region 2—Total | 43, 443 | 36, 839 | 37, 945 | 33, 173 | 25, 778 | 24, 881 | 27, 263 | 27, 271 | 26, 090 | 25, 009 | 27, 046 |
| Delaware | 215 | 193 | 269 | 268 | 251 | 177 | 172 | 288 | 202 | 161 | 184 |
| New Jersey | 5, 880 | 7, 620 | 6, 314 | 5, 864 | 4, 248 | 4, 354 | 3, 936 | 3, 664 | 4, 382 | 3, 565 | 3, 080 |
| New York | 30, 634 | 28, 975 | 27, 539 | 22, 154 | 17, 544 | 16, 402 | 17, 450 | 19, 043 | 16, 941 | 17, 205 | 20, 101 |
| Pennsylvania | [a] 6, 714 | 51 | 3, 823 | 4, 887 | 3, 735 | 3, 948 | 5, 705 | 4, 276 | 4, 565 | [d] 4, 078 | [d] 3, 681 |
| Region 3—Total | 19, 187 | 18, 519 | 22, 475 | 21, 829 | 12, 390 | 10, 525 | 10, 865 | 10, 599 | 11, 323 | 11, 047 | 12, 275 |
| District of Columbia | ------- | ------- | 3, 964 | 4, 867 | 1, 591 | 894 | 970 | 1, 267 | 1, 527 | 1, 659 | 2, 203 |
| Maryland | 2, 176 | 1, 811 | 2, 505 | 2, 893 | 2, 745 | 2, 121 | 2, 018 | 2, 327 | 3, 159 | 2, 461 | 2, 083 |
| North Carolina | 7, 353 | 5, 058 | 5, 867 | 3, 383 | 1, 961 | 1, 336 | 1, 122 | 1, 041 | 1, 229 | 1, 188 | 1, 125 |
| Virginia | 7, 891 | 6, 114 | 5, 377 | 5. 043 | 2, 585 | 2, 680 | 2, 828 | 2, 594 | 1, 879 | 1, 668 | 2, 354 |
| West Virginia | 1, 427 | 1, 621 | 1, 447 | 829 | 644 | 1, 176 | 2, 319 | 1, 941 | 2, 079 | 1, 691 | 1, 421 |
| Puerto Rico | [c] 340 | 3, 853 | 3, 286 | 4, 775 | 2, 827 | 2, 297 | 1, 590 | 1, 391 | 1, 398 | 2, 350 | 3, 054 |
| Virgin Islands | ------- | 62 | 29 | 39 | 37 | 21 | 18 | 38 | 52 | 30 | [d] 35 |
| Region 4—Total | 17, 726 | 18, 905 | 25, 273 | 22, 365 | 17, 116 | 14, 748 | 14, 326 | 15, 155 | 16, 815 | 14, 699 | 12, 737 |
| Kentucky | 2, 501 | 3, 255 | 5, 386 | 2, 839 | 1, 692 | 1, 135 | 1, 497 | 1, 928 | 2, 000 | 1, 720 | 1, 600 |
| Michigan | 4, 691 | 5, 415 | 6, 364 | 7, 460 | 6, 159 | 5, 852 | 6, 548 | 5, 702 | 4, 822 | 4, 569 | 3, 922 |
| Ohio | 10, 534 | 10, 235 | 13, 523 | 12, 066 | 9, 265 | 7, 761 | 6, 281 | 7, 525 | 9, 993 | 8, 410 | 7, 215 |
| Region 5—Total | 20, 397 | 21, 947 | 27, 410 | 22, 826 | 16, 983 | 13, 664 | 12, 526 | 11, 548 | 11, 491 | 10, 684 | 9, 852 |
| Illinois | 14, 900 | 16, 317 | 19, 328 | 17, 315 | 12, 602 | 9, 579 | 8, 306 | 7, 727 | 7, 232 | 6, 457 | 6, 109 |
| Indiana | 2, 635 | 2, 764 | 5, 000 | 3, 063 | 2, 181 | 1, 890 | 2, 514 | 2, 102 | 2, 320 | 2, 114 | 2, 202 |
| Minnesota | 1, 991 | 2, 153 | 2, 213 | 1, 737 | 1, 118 | 677 | 664 | 610 | 673 | 844 | 421 |
| Wisconsin | 871 | 713 | 869 | 711 | 1, 082 | 1, 518 | 1, 042 | 1, 109 | 1, 266 | 1, 269 | 1, 120 |

See footnotes at end of table, p. 397.

## Cases of Syphilis and Gonorrhea Reported to the Public Health Service by State and Territorial Health Departments, Fiscal Years 1941–51—Continued

[Known military cases excluded]

| Federal Security Agency regions | 1941 | 1942 | 1943 | 1944 | 1945 | 1946 | 1947 | 1948 | 1949 | 1950 | 1951 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LATE AND LATE LATENT SYPHILIS | | | | | | | | | | | |
| Region 6—Total | 49, 487 | 51, 532 | 64, 734 | 43, 948 | 25, 846 | 25, 747 | 24, 306 | 22, 344 | 20, 900 | 19, 988 | 18, 871 |
| Alabama | 5, 360 | 3, 787 | 6, 226 | 4, 318 | 2, 525 | 2, 649 | 6, 285 | 7, 662 | 2, 630 | 2, 124 | 1, 596 |
| Florida | 7, 864 | 10, 209 | 17, 127 | 12, 193 | 6, 216 | 4, 262 | 5, 044 | 4, 009 | 5, 234 | 4, 527 | 4, 971 |
| Georgia | 6, 314 | 5, 918 | 9, 955 | 5, 657 | 3, 331 | 6, 928 | 3, 900 | 3, 852 | 3, 421 | 3, 091 | 3, 161 |
| Mississippi | 13, 868 | 14, 528 | 14, 085 | 8, 566 | 6, 401 | 6, 435 | 4, 386 | 2, 618 | 6, 263 | 6, 053 | 4, 812 |
| South Carolina | 6, 596 | 6, 526 | 5, 611 | 5, 148 | 2, 356 | 1, 459 | 1, 655 | 1, 335 | 1, 344 | 1, 952 | 1, 632 |
| Tennessee | 9, 485 | 10, 564 | 11, 730 | 8, 066 | 5, 017 | 4, 014 | 3, 036 | 2, 868 | 2, 008 | 2, 241 | 2, 699 |
| Region 7—Total | 5, 895 | 10, 283 | 8, 949 | 8, 536 | 6, 733 | 5, 733 | 5, 667 | 5, 367 | 6, 090 | 6, 681 | 5, 975 |
| Iowa | 1, 209 | 1, 153 | 1, 264 | 1, 046 | 577 | 429 | 437 | 847 | 867 | 1, 231 | 1, 052 |
| Kansas | 1, 018 | 1, 621 | 2, 037 | 1, 539 | 1, 352 | 818 | 1, 058 | 1, 102 | 1, 749 | 1, 567 | 1, 350 |
| Missouri | 2, 814 | 6, 267 | 4, 240 | 5, 108 | 3, 898 | 3, 652 | 3, 173 | 2, 745 | 2, 798 | 3, 095 | 2, 943 |
| Nebraska | 492 | 824 | 1, 080 | 526 | 623 | 628 | 772 | 465 | 493 | 579 | 427 |
| North Dakota | 123 | 136 | 143 | 88 | 80 | 49 | 71 | 91 | 79 | 102 | 111 |
| South Dakota | 239 | 282 | 185 | 229 | 203 | 157 | 156 | 117 | 104 | 107 | 92 |
| Region 8—Total | 19, 793 | 23, 506 | 34, 580 | 22, 239 | 13, 819 | 11, 793 | 11, 092 | 17, 624 | 16, 636 | 14, 617 | 12, 205 |
| Arkansas | 4, 226 | 4, 206 | 6, 661 | 3, 769 | 4, 151 | 3, 565 | 3, 048 | 9, 460 | 6, 996 | 4, 243 | 3, 020 |
| Louisiana | 55 | [a] 5, 591 | 8, 376 | 4, 680 | 2, 794 | 2, 610 | 2, 507 | 2, 062 | 3, 425 | 4, 116 | 4, 102 |
| New Mexico | 795 | 835 | 1, 246 | 1, 021 | 838 | 706 | 434 | 503 | 499 | 394 | 398 |
| Oklahoma | 2, 631 | 2, 884 | 2, 932 | 2, 992 | 2, 204 | 2, 235 | 3, 004 | 2, 592 | 2, 119 | 1, 833 | 1, 680 |
| Texas | 12, 086 | 9, 990 | 15, 365 | 9, 777 | 3, 832 | 2, 677 | 2, 099 | 3, 007 | 3, 597 | 4, 031 | 3, 005 |
| Region 9—Total | 3, 359 | 3, 516 | 3, 687 | 2, 941 | 2, 380 | 1, 506 | 1, 386 | 1, 435 | 1, 218 | 1, 031 | 747 |
| Colorado | 2, 260 | 2, 493 | 2, 616 | 1, 513 | 1, 102 | 821 | 723 | 666 | 505 | 491 | 358 |
| Idaho | 175 | 215 | 200 | 249 | 382 | 267 | 275 | 312 | 136 | 199 | 182 |
| Montana | 173 | 208 | 226 | 165 | 127 | 63 | 64 | 214 | 218 | 103 | 73 |
| Utah | 575 | 466 | 388 | 489 | 312 | 238 | 221 | 171 | 270 | 163 | 41 |
| Wyoming | [a] 176 | 134 | 257 | 525 | 457 | 117 | 103 | 72 | 89 | 75 | 93 |
| Region 10—Total | 16, 311 | 14, 664 | 24, 072 | 24, 020 | 19, 303 | 14, 650 | 13, 097 | 11, 647 | 10, 703 | 10, 064 | 8, 701 |
| Arizona | 607 | 483 | 1, 493 | 1, 094 | 600 | 454 | 400 | 357 | 392 | 802 | 710 |
| California | 12, 796 | 11, 177 | 18, 615 | 18, 770 | 15, 604 | 11, 560 | 10, 616 | 9, 058 | 8, 311 | 7, 552 | 6, 794 |
| Nevada | 236 | 355 | 563 | 546 | 165 | 212 | 268 | 385 | 470 | 378 | 276 |
| Oregon | [a] 741 | 570 | 929 | 1, 174 | 1, 022 | 734 | 576 | 714 | 358 | 414 | 233 |
| Washington | 1, 522 | 1, 738 | 1, 874 | 1, 816 | 1, 531 | 1, 071 | 701 | 721 | 788 | 587 | 440 |
| Alaska | [b] 98 | 71 | 38 | 17 | 21 | 33 | 18 | 45 | 107 | 74 | 38 |
| Hawaii | 311 | 270 | 560 | 603 | 360 | 586 | 518 | 367 | 277 | 257 | 210 |
| Canal Zone | ------ | ------ | ------ | ------ | 499 | 307 | 150 | 125 | 125 | 228 | 228 |
| Continental United States | 201, 190 | 202, 216 | 252, 995 | 203, 396 | 142, 731 | 125, 836 | 122, 257 | 123, 972 | 121, 933 | 113, 174 | 107, 133 |
| United States, including Territories | 201, 939 | 206, 472 | 256, 908 | 208, 830 | 146, 475 | 129, 080 | 124, 551 | 125, 938 | 123, 892 | 116, 113 | 110, 698 |

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[a] Includes estimate for 1 month not reported.
[b] Includes estimate for 2 months not reported.
[c] Data for 1 month; reporting began in June.
[d] Estimated.

Source: PHS Forms 8958–B and 688 FSA–PHS Division of Venereal Disease, Office of Statistics Oct. 10 1951 (ML–BBM)mws.

## Cases of Syphilis and Gonorrhea Reported to the Public Health Service by State and Territorial Health Departments, Fiscal Years 1941–51—Continued

[Known military cases excluded]

| Federal Security Agency regions | 1941 | 1942 | 1943 | 1944 | 1945 | 1946 | 1947 | 1948 | 1949 | 1950 | 1951 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| CONGENITAL SYPHILIS | | | | | | | | | | | |
| Region 1—Total | 643 | 692 | 561 | 603 | 431 | 400 | 402 | 343 | 267 | 219 | 222 |
| Connecticut | 153 | 159 | 106 | 147 | 71 | 68 | 69 | 53 | 45 | 45 | 41 |
| Maine | 68 | 96 | 98 | 105 | 60 | 34 | 33 | 33 | 26 | 17 | 24 |
| Massachusetts | 303 | 303 | 276 | 294 | 220 | 208 | 211 | 169 | 127 | 101 | 95 |
| New Hampshire | 35 | 36 | 23 | 21 | 26 | 27 | 26 | 29 | 11 | 17 | 23 |
| Rhode Island | 70 | 81 | 41 | 24 | 35 | 48 | 43 | 47 | 35 | 31 | 26 |
| Vermont | 14 | 17 | 17 | 12 | 19 | 15 | 20 | 12 | 23 | 8 | 13 |
| Region 2—Total | 3, 157 | 2, 187 | 2, 067 | 2, 061 | 1, 738 | 1, 729 | 1, 695 | 1, 669 | 1, 479 | 1, 258 | 1, 240 |
| Delaware | 28 | 43 | 40 | 25 | 36 | 39 | 22 | 30 | 26 | 15 | 28 |
| New Jersey | 598 | 510 | 372 | 423 | 335 | 288 | 226 | 204 | 222 | 212 | 231 |
| New York | 1, 671 | 1, 553 | 1, 245 | 976 | 872 | 874 | 819 | 872 | 729 | 664 | 694 |
| Pennsylvania | [a] 860 | 81 | 410 | 637 | 495 | 528 | 628 | 563 | 502 | [d] 367 | [d] 287 |
| Region 3—Total | 2, 388 | 3, 431 | 2, 984 | 2, 907 | 3, 342 | 3, 070 | 3, 111 | 2, 524 | 2, 498 | 2, 604 | 2, 818 |
| District of Columbia | ------ | ------ | 156 | 130 | 106 | 67 | 125 | 141 | 95 | 69 | 71 |
| Maryland | 212 | 160 | 168 | 131 | 212 | 136 | 173 | 243 | 271 | 221 | 206 |
| North Carolina | 1, 037 | 617 | 405 | 204 | 272 | 395 | 392 | 382 | 384 | 372 | 369 |
| Virginia | 639 | 519 | 388 | 263 | 345 | 299 | 343 | 367 | 206 | 191 | 245 |
| West Virginia | 210 | 194 | 173 | 114 | 75 | 168 | 310 | 244 | 255 | 198 | 170 |
| Puerto Rico | [c] 290 | 1, 933 | 1, 685 | 2, 057 | 2, 327 | 2, 002 | 1, 765 | 1, 144 | 1, 272 | 1, 547 | 1, 753 |
| Virgin Islands | ------ | 8 | 9 | 8 | 5 | 3 | 3 | 3 | 15 | 6 | [d] 4 |
| Region 4—Total | 1, 548 | 2, 315 | 1, 893 | 1, 641 | 1, 367 | 1, 300 | 1, 281 | 1, 494 | 1, 380 | 1, 197 | 1, 196 |
| Kentucky | 199 | 383 | 410 | 274 | 238 | 240 | 183 | 209 | 177 | 175 | 318 |
| Michigan | 460 | 529 | 478 | 455 | 389 | 405 | 507 | 492 | 416 | 335 | 277 |
| Ohio | 889 | 1, 403 | 1, 005 | 912 | 740 | 655 | 591 | 793 | 787 | 687 | 601 |
| Region 5—Total | 1, 344 | 1, 190 | 1, 263 | 973 | 914 | 778 | 947 | 965 | 1, 017 | 788 | 757 |
| Illinois | 860 | 737 | 735 | 597 | 636 | 549 | 572 | 536 | 474 | 416 | 397 |
| Indiana | 352 | 313 | 401 | 251 | 193 | 156 | 251 | 271 | 392 | 210 | 252 |
| Minnesota | 96 | 118 | 106 | 116 | 66 | 46 | 54 | 41 | 37 | 42 | 17 |
| Wisconsin | 36 | 22 | 21 | 9 | 19 | 27 | 70 | 117 | 114 | 120 | 91 |
| Region 6—Total | 4, 603 | 4, 655 | 4, 551 | 3, 340 | 2, 925 | 3, 117 | 2, 820 | 2, 746 | 3, 597 | 4, 163 | 4, 295 |
| Alabama | 653 | 440 | 509 | 383 | 347 | 388 | 488 | 473 | 439 | 269 | 330 |
| Florida | 547 | 535 | 825 | 576 | 427 | 489 | 444 | 460 | 595 | 460 | 483 |
| Georgia | 405 | 768 | 733 | 453 | 339 | 525 | 446 | 560 | 1, 116 | 1, 284 | 1, 103 |
| Mississippi | 1, 837 | 1, 754 | 1, 511 | 1, 148 | 1, 049 | 1, 030 | 929 | 721 | 941 | 1, 481 | 1, 406 |
| South Carolina | 367 | 523 | 397 | 354 | 364 | 397 | 214 | 277 | 259 | 345 | 313 |
| Tennessee | 794 | 635 | 576 | 426 | 399 | 288 | 299 | 255 | 247 | 324 | 660 |
| Region 7—Total | 734 | 856 | 564 | 697 | 618 | 510 | 610 | 580 | 569 | 586 | 580 |
| Iowa | 122 | 102 | 102 | 142 | 67 | 37 | 52 | 110 | 83 | 126 | 108 |
| Kansas | 131 | 164 | 118 | 107 | 110 | 78 | 134 | 115 | 177 | 128 | 109 |
| Missouri | 375 | 488 | 238 | 352 | 339 | 316 | 326 | 259 | 245 | 254 | 298 |
| Nebraska | 40 | 56 | 64 | 39 | 50 | 52 | 72 | 43 | 38 | 43 | 37 |
| North Dakota | 33 | 18 | 19 | 23 | 13 | 8 | 8 | 25 | 7 | 9 | 14 |
| South Dakota | 33 | 28 | 23 | 34 | 39 | 19 | 18 | 28 | 19 | 26 | 14 |
| Region 8—Total | 1, 877 | 2, 263 | 2, 379 | 1, 897 | 2, 006 | 2, 175 | 2, 119 | 3, 191 | 3, 878 | 3, 358 | 2, 889 |
| Arkansas | 251 | 248 | 304 | 233 | 443 | 572 | 492 | 1, 299 | 1, 235 | 955 | 588 |
| Louisiana | 11 | [a] 367 | 560 | 469 | 596 | 630 | 607 | 520 | 687 | 914 | 1, 159 |
| New Mexico | 107 | 117 | 120 | 86 | 135 | 81 | 89 | 103 | 116 | 100 | 82 |
| Oklahoma | 281 | 318 | 349 | 301 | 266 | 376 | 363 | 275 | 248 | 142 | 180 |
| Texas | 1, 227 | 1, 213 | 1, 046 | 808 | 566 | 516 | 568 | 994 | 1, 592 | 1, 247 | 880 |
| Region 9—Total | 370 | 308 | 294 | 213 | 205 | 139 | 148 | 156 | 156 | 116 | 91 |
| Colorado | 280 | 224 | 233 | 136 | 97 | 89 | 76 | 67 | 57 | 73 | 46 |
| Idaho | 20 | 18 | 20 | 23 | 35 | 22 | 30 | 30 | 18 | 6 | 9 |
| Montana | 10 | 7 | 11 | 7 | 21 | 12 | 17 | 33 | 20 | 13 | 8 |
| Utah | 49 | 37 | 13 | 18 | 15 | 14 | 16 | 20 | 50 | 16 | 15 |
| Wyoming | [a] 11 | 22 | 17 | 29 | 37 | 2 | 9 | 6 | 11 | 8 | 13 |
| Region 10—Total | 1, 288 | 1, 024 | 1, 386 | 1, 375 | 1, 163 | 949 | 987 | 840 | 821 | 768 | 538 |
| Arizona | 136 | 50 | 131 | 138 | 127 | 72 | 55 | 53 | 52 | 141 | 68 |
| California | 910 | 732 | 966 | 964 | 841 | 678 | 733 | 648 | 578 | 472 | 375 |
| Nevada | 30 | 22 | 28 | 27 | 11 | 13 | 22 | 14 | 35 | 27 | 23 |
| Oregon | [a] 55 | 33 | 69 | 60 | 62 | 51 | 56 | 30 | 16 | 17 | 17 |

See footnotes at end of table, p. 399.

## Cases of Syphilis and Gonorrhea Reported to the Public Health Service by State and Territorial Health Departments, Fiscal Years 1941–51—Continued

[Known military cases excluded]

| Federal Security Agency regions | 1941 | 1942 | 1943 | 1944 | 1945 | 1946 | 1947 | 1948 | 1949 | 1950 | 1951 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| CONGENITAL SYPHILIS | | | | | | | | | | | |
| Washington | 87 | 131 | 117 | 120 | 84 | 79 | 53 | 43 | 60 | 53 | 22 |
| Alaska | [b] 5 | 5 | 7 | 1 | 2 | 5 | 1 | 4 | 19 | 15 | 3 |
| Hawaii | 65 | 51 | 68 | 65 | 36 | 51 | 67 | 48 | 61 | 43 | 30 |
| Canal Zone | ------ | ------ | ------ | ------ | 21 | 14 | 7 | 2 | 5 | 5 | 6 |
| Continental United States | 17, 592 | 16, 924 | 16, 173 | 13, 576 | 12, 339 | 12, 106 | 12, 284 | 13, 309 | 14, 295 | 13, 446 | 12, 836 |
| United States including Territories | 17, 952 | 18, 921 | 17, 942 | 15, 707 | 14, 730 | 14, 181 | 14, 127 | 14, 510 | 15, 667 | 15, 062 | 14, 632 |

[a] Includes estimate for 1 month not reported.
[b] Includes estimate for 2 months not reported.
[c] Data for 1 month; reporting began in June.
[d] Estimated.

Source: PHS Forms 8958–B and 688 FSA–PHS Division of Venereal Disease, Office of Statistics, Oct. 11, 1951 (ML–BBM)mws.

## Cases of Syphilis and Gonorrhea Reported to the Public Health Service by State and Territorial Health Departments, Fiscal Years 1941–51—Continued

[Known military cases excluded]

| Federal Security Agency regions | 1941 | 1942 | 1943 | 1944 | 1945 | 1946 | 1947 | 1948 | 1949 | 1950 | 1951 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| GONORRHEA | | | | | | | | | | | |
| Region 1—Total | 6, 507 | 7, 016 | 6, 829 | 7, 285 | 7, 837 | 8, 763 | 7, 833 | 5, 340 | 4, 497 | 3, 716 | 3, 001 |
| Connecticut | 1, 273 | 1, 433 | 1, 404 | 1, 531 | 1, 311 | 1, 251 | 1, 362 | 1, 000 | 954 | 868 | 697 |
| Maine | 457 | 644 | 723 | 946 | 1, 161 | 1, 124 | 752 | 507 | 339 | 297 | 237 |
| Massachusetts | 3, 904 | 3, 979 | 3, 869 | 3, 402 | 3, 813 | 4, 988 | 4, 014 | 2, 886 | 2, 520 | 2, 041 | 1, 723 |
| New Hampshire | 142 | 248 | 189 | 195 | 226 | 522 | 377 | 228 | 137 | 76 | 76 |
| Rhode Island | 503 | 533 | 472 | 999 | 977 | 467 | 838 | 398 | 311 | 275 | 181 |
| Vermont | 228 | 179 | 172 | 212 | 349 | 411 | 490 | 321 | 236 | 153 | 87 |
| Region 2—Total | 24, 499 | 23, 109 | 24, 231 | 25, 865 | 21, 752 | 31, 042 | 38, 366 | 42, 828 | 42, 884 | 37, 139 | 31, 894 |
| Delaware | 460 | 378 | 157 | 239 | 227 | 303 | 350 | 305 | 230 | 242 | 236 |
| New Jersey | 3, 599 | 5, 125 | 6, 292 | 5, 264 | 4, 509 | 5, 552 | 6, 612 | 5, 904 | 4, 812 | 3, 992 | 3, 940 |
| New York | 19, 830 | 16, 728 | 17, 255 | 19, 093 | [a] 15, 409 | [a] 20, 840 | [b] 23, 081 | 27, 047 | 27, 402 | 20, 929 | 18, 415 |
| Pennsylvania | [c] 610 | [c] 878 | [c] 527 | [d] 1, 269 | [c] 1, 607 | [c] 4, 347 | [e] 8, 323 | 9, 572 | 10, 440 | [f] 11, 976 | [f] 9, 303 |
| Region 3—Total | 20, 018 | 32, 478 | 37, 635 | 39, 989 | 35, 864 | 50, 495 | 59, 728 | 58, 928 | 64, 760 | 61, 170 | 52, 710 |
| District of Columbia | 3, 407 | 3, 824 | 3, 784 | 4, 236 | 5, 642 | 7, 949 | 12, 252 | 12, 518 | 16, 689 | 15, 231 | 12, 542 |
| Maryland | 4, 197 | 5, 632 | 7, 907 | 6, 557 | 4, 999 | 5, 639 | 6, 515 | 8, 277 | 7, 483 | 8, 329 | 7, 462 |
| North Carolina | 5, 360 | 7, 918 | 11, 312 | 9, 660 | 8, 971 | 12, 766 | 13, 865 | 13, 486 | 15, 361 | 15, 564 | 13, 667 |
| Virginia | 3, 560 | 6, 570 | 8, 863 | 12, 479 | 6, 353 | 10, 402 | 13, 860 | 12, 267 | 11, 295 | 10, 304 | 9, 223 |
| West Virginia | 3, 206 | 4, 298 | 2, 428 | 2, 369 | 3, 261 | 8, 014 | 6, 568 | 5, 222 | 4, 707 | 4, 013 | 2, 975 |
| Puerto Rico | [g] 288 | 3, 942 | 3, 184 | 4, 436 | 6, 522 | 5, 558 | 6, 452 | 7, 037 | 9, 102 | 7, 596 | 6, 774 |
| Virgin Islands | ------ | 294 | 157 | 252 | 116 | 167 | 216 | 121 | 123 | 133 | [f] 67 |
| Region 4—Total | 15, 553 | 17, 039 | 17, 570 | 20, 894 | 22, 786 | 27, 425 | 31, 002 | 27, 903 | 26, 660 | 24, 184 | 20, 951 |
| Kentucky | 3, 988 | 4, 171 | 4, 331 | 3, 770 | 5, 177 | 7, 607 | 9, 935 | 7, 153 | 6, 087 | 5, 170 | 3, 886 |
| Michigan | 7, 930 | 8, 956 | 8, 749 | 11, 349 | 11, 566 | 12, 476 | 11, 327 | 10, 221 | 9, 182 | 9, 213 | 8, 644 |
| Ohio | 3, 635 | 3, 912 | 4, 490 | 5, 775 | 6, 043 | 7, 342 | 9, 740 | 10, 529 | 11, 391 | 9, 801 | 8, 421 |
| Region 5—Total | 23, 284 | 25, 048 | 26, 872 | 29, 378 | 26, 971 | 40, 613 | 39, 779 | 37, 039 | 31, 667 | 26, 981 | 24, 572 |
| Illinois | 18, 483 | 20, 769 | 20, 071 | 22, 989 | 21, 080 | 33, 197 | 34, 545 | 31, 611 | 26, 841 | 22, 385 | 20, 749 |
| Indiana | 1, 952 | 1, 839 | 4, 510 | 3, 366 | 2, 531 | 3, 211 | 2, 007 | 2, 818 | 2, 909 | 2, 983 | 2, 373 |
| Minnesota | 1, 803 | 1, 712 | 1, 515 | 1, 961 | 2, 280 | 2, 613 | 1, 826 | 1, 527 | 1, 061 | 957 | 724 |
| Wisconsin | 1, 046 | 728 | 776 | 1, 062 | 1, 080 | 1, 592 | 1, 401 | 1, 083 | 856 | 656 | 726 |

See footnotes at end of table, p. 400.

## Cases of Syphilis and Gonorrhea Reported to the Public Health Service by State and Territorial Health Departments, Fiscal Years 1941–51—Continued

[Known military cases excluded]

| Federal Security Agency regions | 1941 | 1942 | 1943 | 1944 | 1945 | 1946 | 1947 | 1948 | 1949 | 1950 | 1951 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| GONORRHEA | | | | | | | | | | | |
| Region 6—Total | 43, 116 | 57, 140 | 85, 245 | 81, 664 | 80, 010 | 108, 256 | 116, 278 | 88, 806 | 78, 815 | 77, 875 | 70, 575 |
| Alabama | 5, 222 | 4, 853 | 8, 489 | 6, 561 | 6, 822 | 10, 235 | 9, 027 | 7, 217 | 5, 622 | 5, 014 | 3, 593 |
| Florida | 2, 236 | 5, 594 | 14, 376 | 16, 065 | 12, 990 | 16, 239 | 19, 071 | 19, 308 | 16, 055 | 14, 268 | 13, 368 |
| Georgia | 1, 435 | 4, 891 | 12, 219 | 9, 400 | 8, 766 | 12, 524 | 17, 151 | 16, 287 | 15, 362 | 14, 560 | 14, 258 |
| Mississippi | 28, 777 | 30, 749 | 32, 853 | 30, 351 | 31, 156 | 38, 717 | 33, 800 | 12, 422 | 10, 016 | 12, 747 | 11, 502 |
| South Carolina | 1, 292 | 3, 823 | 6, 058 | 6, 102 | 6, 711 | 9, 512 | 10, 514 | 9, 824 | 9, 233 | 9, 564 | 7, 738 |
| Tennessee | 4, 154 | 7, 230 | 11, 250 | 13, 185 | 13, 565 | 21, 029 | 26, 715 | 23, 748 | 22, 527 | 21, 722 | 20, 116 |
| Region 7—Total | 7, 995 | 8, 152 | 9, 773 | 11, 779 | 14, 489 | 16, 712 | 13, 623 | 10, 948 | 9, 520 | 8, 340 | 7, 306 |
| Iowa | 1, 534 | 1, 264 | 1, 654 | 1, 816 | 2, 349 | 2, 258 | 1, 581 | 1, 224 | 1, 036 | 754 | 767 |
| Kansas | 1, 243 | 1, 123 | 1, 417 | 1, 556 | 1, 811 | 2, 872 | 2, 661 | 1, 900 | 1, 435 | 1, 411 | 1, 248 |
| Missouri | 3, 653 | 3, 990 | 4, 480 | 6, 412 | 8, 090 | 8, 705 | 7, 261 | 6, 255 | 5, 557 | 4, 805 | 4, 337 |
| Nebraska | 890 | 1, 122 | 1, 678 | 1, 373 | 1, 384 | 1, 443 | 1, 174 | 849 | 896 | 898 | 633 |
| North Dakota | 421 | 433 | 258 | 265 | 380 | 736 | 396 | 248 | 186 | 164 | 104 |
| South Dakota | 254 | 220 | 286 | 357 | 475 | 698 | 550 | 472 | 410 | 308 | 217 |
| Region 8—Total | 19, 525 | 20, 668 | 34, 059 | 37, 191 | 40, 749 | 43, 802 | 54, 810 | 58, 502 | 49, 441 | 45, 814 | 43, 176 |
| Arkansas | 1, 850 | 4, 282 | 4, 839 | 4, 270 | 7, 093 | 6, 632 | 7, 164 | 6, 295 | 4, 804 | 4, 246 | 3, 518 |
| Louisiana | [h] 1, 721 | 3, 146 | 8, 465 | 14, 707 | 10, 840 | 11, 499 | 13, 242 | 13, 143 | 12, 420 | 11, 660 | 10, 163 |
| New Mexico | 518 | 375 | 858 | 1, 405 | 1, 391 | 1, 493 | 1, 407 | 1, 182 | 1, 017 | 735 | 632 |
| Oklahoma | 4, 317 | 3, 128 | 4, 533 | 5, 337 | 8, 719 | 9, 192 | 9, 040 | 8, 071 | 6, 161 | 5, 576 | 4, 910 |
| Texas | 11, 119 | 9, 737 | 15, 364 | 11, 472 | 12, 706 | 14, 986 | 23, 957 | 29, 811 | 25, 039 | 23, 597 | 23, 953 |
| Region 9—Total | 2, 536 | 2, 589 | 3, 934 | 3, 991 | 3, 559 | 4, 141 | 3, 831 | 3, 203 | 2, 783 | 2, 208 | 1, 807 |
| Colorado | 1, 313 | 1, 455 | 2, 107 | 1, 988 | 2, 012 | 2, 328 | 2, 225 | 1, 951 | 1, 697 | 1, 306 | 1, 077 |
| Idaho | 123 | 156 | 356 | 840 | 490 | 556 | 660 | 478 | 389 | 407 | 350 |
| Montana | 232 | 167 | 403 | 296 | 299 | 327 | 318 | 259 | 239 | 142 | 185 |
| Utah | 470 | 419 | 747 | 681 | 561 | 630 | 425 | 357 | 319 | 249 | 92 |
| Wyoming | [h] 398 | 392 | 321 | 186 | 197 | 300 | 203 | 158 | 139 | 104 | 103 |
| Region 10—Total | 29, 999 | 25, 315 | 34, 775 | 49, 468 | 38, 989 | 40, 475 | 43, 548 | 38, 034 | 31, 183 | 25, 519 | 22, 141 |
| Arizona | 1, 850 | 507 | 1, 258 | 1, 760 | 1, 128 | 1, 446 | 1, 581 | 1, 329 | 951 | 1, 506 | 1, 449 |
| California | 20, 825 | 17, 992 | 24, 499 | 36, 603 | 28, 456 | 29, 947 | 33, 998 | 29, 825 | 24, 760 | 19, 896 | 17, 359 |
| Nevada | 149 | 211 | 279 | 409 | 699 | 361 | 483 | 662 | 636 | 335 | 222 |
| Oregon | [h] 1, 236 | 766 | 837 | 1, 399 | 2, 392 | 2, 298 | 2, 042 | 1, 670 | 1, 008 | 740 | 694 |
| Washington | 4, 501 | 3, 905 | 5, 968 | 7, 066 | 4, 940 | 5, 277 | 3, 973 | 3, 189 | 2, 504 | 1, 817 | 1. 573 |
| Alaska | [i] 353 | 691 | 570 | 448 | 484 | 673 | 797 | 639 | 565 | 701 | 471 |
| Hawaii | 1, 085 | 1, 243 | 1, 364 | 1, 783 | 890 | 473 | 674 | 720 | 759 | 524 | 373 |
| Canal Zone | ------- | ------- | ------- | ------- | 688 | 870 | 995 | 636 | 653 | 571 | 754 |
| Continental United States | 191, 306 | 212, 384 | 275, 648 | 300, 585 | 284, 994 | 364, 853 | 400, 659 | 363, 014 | 331, 661 | 303, 992 | 270, 448 |
| United States including Territories | 193, 032 | 218, 554 | 280, 923 | 307, 504 | 293, 694 | 372, 594 | 409, 793 | 372, 167 | 342, 863 | 313, 517 | 278, 887 |

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[a] New York City only.

[b] New York City plus previously untreated cases diagnosed by clinics and R. T. C.'s in up-State New York.

[c] Philadelphia and Pittsburgh only (Form VM–820).

[d] All Pennsylvania for first half of fiscal year. Philadelphia and Pittsburgh only (Form VM–820) for last half of year.

[e] Philadelphia and Pittsburgh (Form VM–820) plus previously untreated cases diagnosed.

[f] Estimated.

[g] Data for 1 month: reporting began in June.

[h] Includes estimate for 1 month not reported.

[i] Includes estimates for 2 months not reported.

Source: PHS Forms 8958–B and 688 FSA–PHS Division of Venereal Disease, Office of Statistics, Oct. 11, 1951 (ML–BBM) mws.

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NOTE: E, Editorial; OA, original article; AB, abstract; NR, Current Notes and Reports; S, Statistics.

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